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FOOTHILL COUNTIES MINING HANDBOOK

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MINES AND GEOLOGY

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DIVISION OF MINES AND GEOLOGY
JAMES F. DAVIS
STATE GEOLOGIST

THE FOOTHILL COUNTIES

MINING HANDBOOK

Prepared by the

SIERRA ECONOMIC DEVELOPMENT DISTRICT

and the

SIERRA PLANNING ORGANIZATION

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October 1985

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Copies of the report are available at a nominal cost from the

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THIS HANDBOOK IS DEDICATED TO THE MEMORY OF

EDWARD LOGAN,

SIERRA COUNTY SUPERVISOR,

FOR HIS YEARS OF SERVICE IN THE PUBLIC AND PRIVATE SECTORS
AND FOR HIS CARE AND CONCERN FOR THE QUALITY OF LIFE
IN THE SIERRA NEVADA FOOTHILLS

FOREWORD

"The Foothill Counties Mining Handbook" was prepared by the Sierra Economic Development District and the Sierra Planning Organization Mining Task Force, two related, nonprofit organizations funded by federal grants and matching funds from El Dorado, Sierra, Placer, and Nevada counties. The Sierra Planning Organization was created specifically to develop a cooperative approach to solving the problems associated with mining land-use planning in these four counties. The two organizations prepared "The Foothill Counties Mining Handbook" as an informational tool to be used by various groups concerned with mining activities in these counties. The handbook presents an overview of mining from the initial phases of exploration to excavation, mine closure, and reclamation of the land. It describes the permitting process, briefly outlines laws and regulations governing mineral extraction, and describes procedures designed to protect the environment and the community from adverse effects of mining operations.

The California Department of Conservation has published "The Foothill Counties Mining Handbook" because we believe it is in the best interest of the State to support cooperative planning efforts of communities and to foster an understanding of the importance of mineral resources. The handbook will be a useful model for the development of regulations and permitting procedures in other counties and cities of the state. Although the handbook is not an official presentation of State law or policy, the information it presents is consistent with existing State law and regulatory policies related to the development of mineral resources and the reclamation of mined lands. We are proud to offer "The Foothill Counties Mining Handbook" as a publication of the California Department of Conservation.

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INTRODUCTION

For years, many of California's community land use plans disregarded mineral resource management. Planning strategies were concentrated in areas such as urban growth, commercial and industrial development, and recently, high technology development.

In the last decade, the price of minerals, especially gold, has increased significantly, causing renewed interest in mining the gold reserves that still exist in the Sierra Nevada foothills. In 1975, the State of California adopted the Surface Mining and Reclamation Act, which mandates the Division of Mines and Geology to identify and map the locations of economically important minerals. Classification maps are now being prepared and distributed to city and county agencies to serve as a basis for amending General Plans to include mineral resource management policies.

The current situation in the world market for precious or industrial grade minerals and metals indicates that mining activities will increase dramatically, fueling even more dispute and conflict among property owners, residents, mine operators, and local government officials. Mineral extraction creates public controversy and court challenges to both mine operators and public officials.

As noted in Section II, minerals and metals constitute a resource that must be harvested in order to meet the demands of an industrial, technological society. At the same time, it is important that conservation efforts be employed to assure future supplies of these resources. The need, then, is for mineral resource management planning comparable to the resource management planning that is applied to timber, oil, water, agricultural land, and other finite natural resources.

In order for a realistic plan of mineral harvesting and conservation to succeed, it is essential that government entities, mining operators, and the general public undertake a cooperative effort to better understand basic mining operations and to better define the needs of neighboring landowners and residents.

Since the current source of controversy in the Sierra foothills is mineral mining, this handbook focuses on that subject. The basic approach, however, involving the review process, mitigation measures, and other methods of resolving conflicts, can be successfully applied to other types of mining.

The handbook provides information that will help develop a common understanding of what the exploration and mining operations entail, what government processes and permits are required, and what federal, state, and local agencies or professional organizations can provide assistance and guidance to the various groups involved. It also presents an overview of mining from the initial phase to mine closure and land reclamation projects. It describes the permit process, outlines laws and regulations governing mineral exploration and extraction, and describes various procedures designed to protect the environment and the community from adverse effects of mining operations.

The appendices include technical information on various mining activities, as well as a reference list of governmental agencies that oversee the mining industry and related areas.

SECTION I: MINING IN THE SIERRA FOOTHILLS

Mining operations carried out during California's Gold Rush days were conducted with little or no concern for the environment. Mountains and streams were altered by hydraulic mining and manual labor. Sediment from placer mining choked creeks, streams, and rivers, causing flooding and turbidity. Hardrock mining exposed heavy metals that produced toxic, acidic leachates. Other toxic materials were washed into creeks and rivers from the chemicals used in extracting gold from the ore.

When the gold was depleted, the miners walked away, leaving the mine tailings, waste dumps, open pits, and open mine shafts for future generations. As time passed, nature covered the legacy of devastation left by these activities, and the Gold Rush Era passed into history as a romantic, swashbuckling period in the early days of California.

Recently, the Sierra foothills have experienced an influx of people from urban sections of the state; people who, while they are aware of the historic mining activity that contributes so greatly to the attraction of this area, did not anticipate the resurgence of large-scale mining in their new communities.

Mining was considered a secondary land use by many agencies until 1975, and little specialized land use planning was undertaken for such activities. The usual approach was to identify extraction activities that could be conducted under the provisions of a conditional use permit. Conditional use permit applications and procedures were believed to provide adequate means for public comment and consideration of mining as a land use.

The population increase in the foothills, however, has dictated that the permit method, in regard to mining, be re-examined. Measure A, passed by El Dorado County voters in the November 1984 election, imposes stringent restrictions on mining operations in that county. It requires, in part, that all open-pit and strip mine operators establish a 10,000 foot buffer zone around the mine site. The County, the mining companies, and the State now are attempting to address the implementation of Measure A, and its effect on mineral extraction in El Dorado County. This use of the referendum/initiative process is one method employed by communities to control or restrict mining activities.

Clearly, a modern, comprehensive approach to mineral mining is required in order to meet the needs and demands of communities, local governments, mining operators, and an industrialized society. The authors of this handbook feel that the information provided herein, along with the suggestions and procedures we have outlined, will help establish a foundation on which future actions and enlightened decisions may be based.

SECTION II: MINERAL RESOURCES IN THE FOOTHILLS AND THE IMPORTANCE OF MINERAL MANAGEMENT

In today's highly industrialized society, mineral harvesting and mineral conservation are becoming increasingly important. As rapidly growing technologies create increased demands for raw materials, mineral mining can be expected to increase in scope and diversity. The Sierra foothills region supplies a variety of minerals used in industry and science. The extraction of these minerals contributes significantly to the economic base of the region.

Known minerals in the foothills area include sand, gravel, clay, gold, quartz, granite, decomposed granite, and quarry rock. In addition, small amounts of silver and platinum are sometimes extracted along with gold. The principal minerals currently being extracted are sand and gravel aggregate, clay, quartz, and gold.

Approximately nine-tenths of the area's sand and gravel production is used in combination with portland cement or asphalt compounds in construction and road building. The remainder is special sand, used primarily in glass making, sand blasting, filters, and foundry processes. Sand and gravel deposits are also mined for silica, used in the production of cleansers, abrasives, and toothpaste. The economic value of sand and gravel aggregate production in this area is several times the combined value of all other minerals currently being mined.

Industrial clay mined in the foothills is valued for its superior firing qualities. It is used in all types of ceramic products and pottery, as well as a wide variety of construction materials including roofing tile, interlocking tiles, construction brick, fire brick, and sewer pipe.

In addition to a high quality granite, used for building stone, tombstones, and similar purposes, the foothills also produce decomposed granite. This substance contains no organic material and minimal plant nutrients, has excellent drainage qualities, compacts more solidly than sand, and provides a firm but cushioned base. It is widely used as a base for building pads, and in horticulture, for pathways and other divider areas where plant growth is undesirable.

While jewelry and other decorative applications comprise the largest single use for gold in all parts of the world, industrial applications for gold are increasing. Gold is used in the manufacture of transistors and microelectronic assemblies, and as a finish for electrical connectors. Gold is also used for heat reflection in window glass and aircraft shields. Significant quantities of gold are used in dentistry, and small quantities find applications in the medical and chemical fields.

Quartz is used primarily in the manufacture of radio equipment and glass. Additional industrial applications include sandpaper, fillers, filters, scouring powders, fire brick, and electronic components.

In view of the importance of minerals in our industrialized society, mineral management should assume a major role in the planning efforts of local jurisdictions. It is imperative that harvesting of these minerals be accomplished; however, harvesting must be accompanied by adequate conservation efforts in order to assure a continuing supply of these resources for future needs.

Mineral management planning should begin with an inventory of known mineral deposits. Efforts should be directed to identification of areas where additional deposits may be found. Land uses in surrounding areas must be assessed carefully to determine the feasibility of mining, either at the current time, or in the future. General Plan elements and zoning ordinances should be formulated to deal specifically with mineral mining within the jurisdiction. It may be deemed best to restrict other types of development in areas that have been set aside as future mining sites, or it may be possible to allow only certain types of development in these areas. Whatever approach is taken, it would be wise to discourage residential or commercial building in the immediate vicinity of these reserves.

Attention must be given, also, to the communities in or near which the minerals are found, and provisions made to prevent undue disruption in the daily lives of established residents. Whenever possible, land use planning should be designed to forestall controversy within the community over mining issues, rather than seeking to resolve problems after they have developed. To succeed, however, it will be necessary for local jurisdictions to act rapidly in developing and enacting comprehensive mineral management plans.

Another vital aspect of mineral management is communication with the community. Public perspectives of mineral mining range from indifference to open hostility and suspicion. Efforts to provide public information should be directed toward increasing awareness of the importance of available mineral resources, both as raw materials for industry and science, and as economically remunerative products for the community and the region. A proper appreciation of the value of these natural resources can assist greatly in making mineral mining a land use compatible with other types of development.

SECTION III: OPERATIONAL PHASES OF MINING

The following discussion of the operational phases of mining is quite broad in scope and may be used as a general guideline to the activities frequently undertaken by mining companies in the exploration and development of a profitable mine. Specific operations may vary, and some that are described are not required in all cases.

Figures 1 and 2 illustrate mine development and various types of mines, while Figures 3 and 4 charts the sequence and possible duration of mining phases, from initial prospecting through reclamation.

EXPLORATION

Exploration of a mineral deposit provides knowledge of the size, shape, position, and value of the deposit. The exploration phase frequently consists of two stages: delineation and detailed evaluation.

Delineation is accomplished by drilling or trenching. Neither process causes extensive damage to the landscape, though the equipment employed is a definite noise source. Test holes produced by drilling normally are less than six inches in diameter. Test trenches, dug by backhoe or bulldozer, rarely exceed ten feet in depth and can be refilled and graded immediately when sampling is complete.

Detailed Evaluation consists of mining bulk samples of the mineralized material, underground test drilling, where appropriate, and sometimes additional surface test drilling.

The purpose of bulk sampling is to determine if the mineral can be recovered economically, if at all. Bulk samples are obtained by either surface or underground mining techniques, depending on whether the mineralized zone is at surface or at depth. The sample is then subjected to a variety of metallurgical tests, and in most cases, portions of the bulk sample are transported off-site for laboratory testing.

In certain complex deposits, additional test drilling from underground is required to fully evaluate the potential of the mineralized zone. Underground drilling provides three-dimensional testing of the target, and is more reliable than conventional surface drilling.

Following the detailed evaluation stage, feasibility reports are prepared. A conceptual mining plan relies upon certain economic assumptions, and results in the determination of mining techniques such as underground, surface, or a combination of both.

Metallurgical testing results in a processing plant feasibility study and conceptual design. In addition to economics, plant design depends on the physical and chemical properties of the deposit.

An environmental feasibility study may be prepared, outlining applicable environmental regulations and the approvals required in order to place the property into production. Compliance strategies are formulated and discussed with regulatory authorities. A specific strategy is then selected and baseline study plans formulated. The strategy adopted must address environmentally sensitive

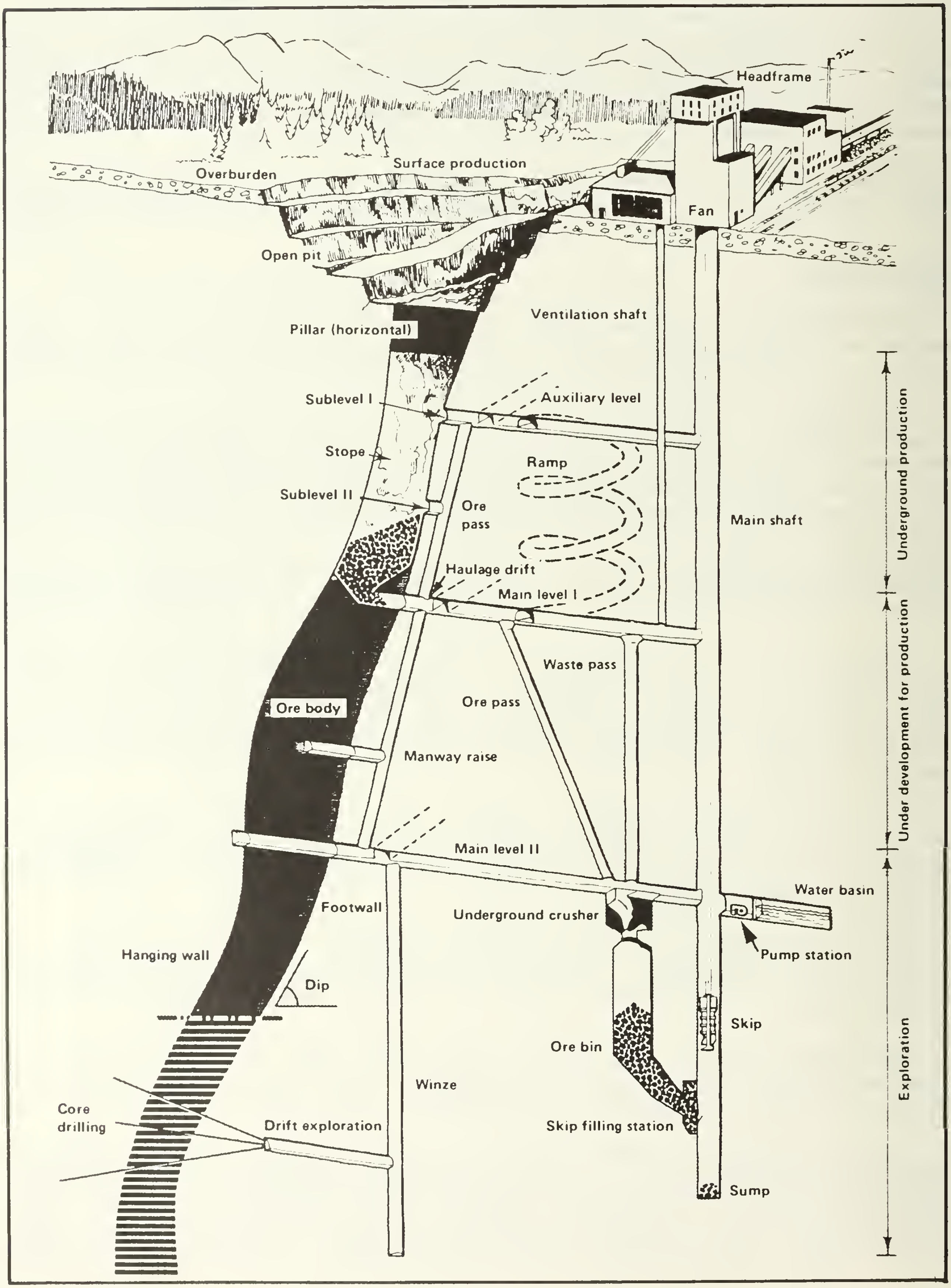
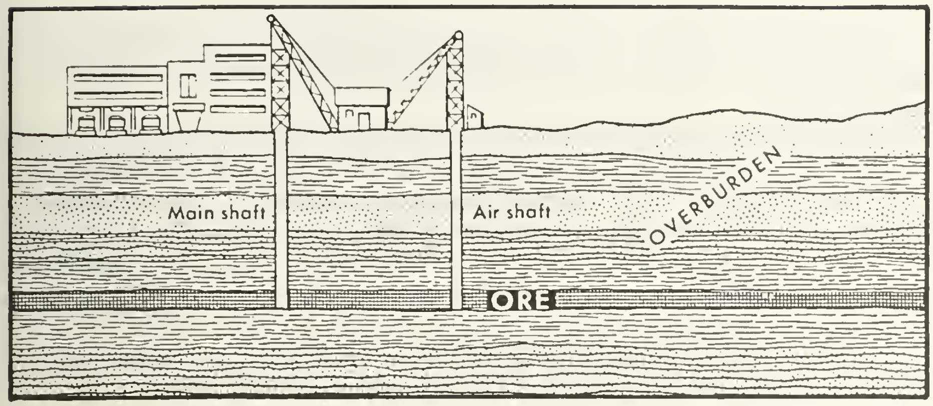
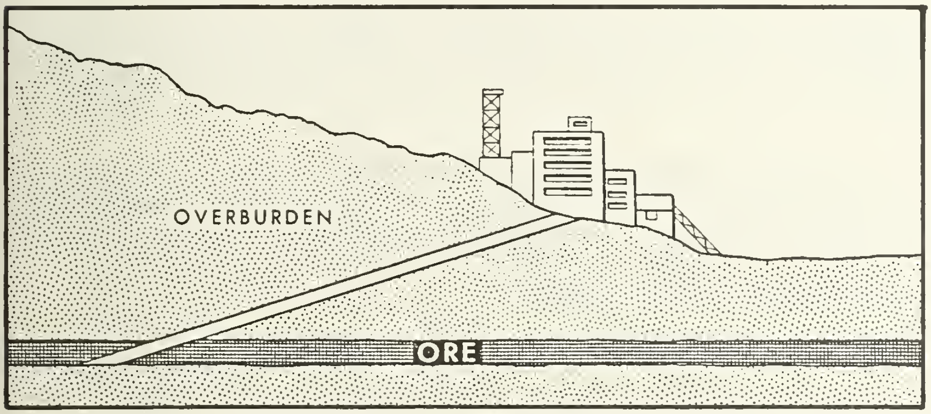


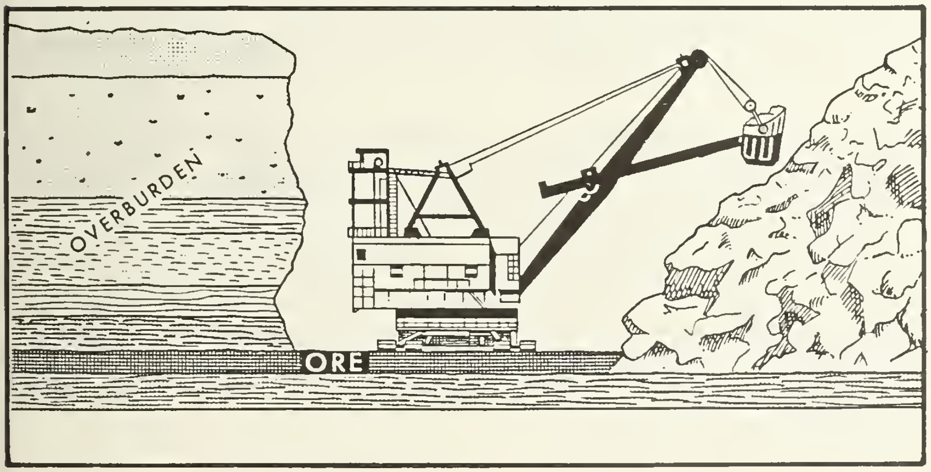
FIGURE 1. Mine Development



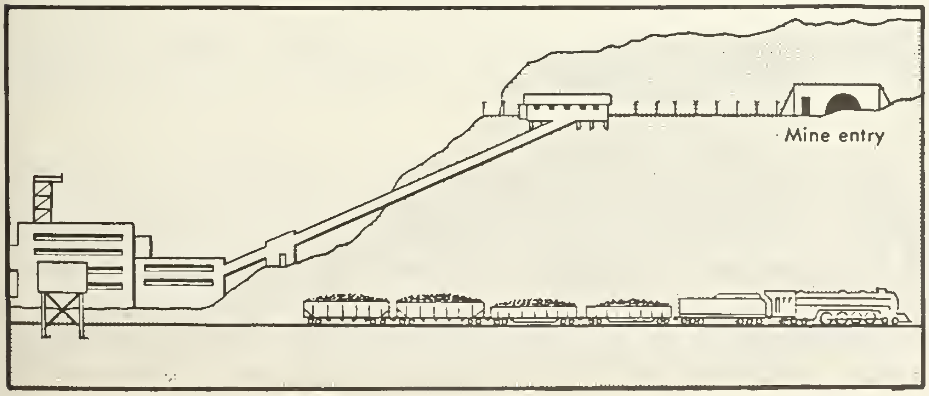
A SHAFT MINE is the most direct method of obtaining ore from a deeply-lying vein. Hoists in the main shaft bring the broken-up ore to the surface; giant fans near the air shaft keep the air circulating.



A SLOPE MINE has a slanting entry into the ore-bearing vein. The ore can thus be hauled up the slope in cars instead of having to be hoisted to the surface in buckets, as in a shaft mine.



A SURFACE MINE, also known as an open-pit mine or a strip mine, is used when the ore lies close to the surface. It is less expensive and safer than underground mining methods.



A DRIFT MINE is a tunnel into the side of a hill where an ore-bearing vein comes to the surface. Often the entry is made below the vein so that the ore can be taken from the tunnel's roof.

FIGURE 2. Types of Mines

issues. The results of the environmental feasibility study sometimes cause modifications of other feasibility studies. The results are incorporated as design factors in the detailed project plans.

The final feasibility study is economic. Important factors for evaluation include the cost of development, mining, and milling; environmental compliance; and taxes. A decision is then made to proceed to the development stage of the project, to hold the project in anticipation of changing economics, or to abandon the project as uneconomical. Appendix A contains a comprehensive description of geophysical exploration.

DEVELOPMENT

This phase covers the work required to prepare the site for actual mineral production. It includes additional engineering studies, filing and approval of permit applications, construction of the physical plant, and driving openings to, and into, the mineral deposit.

The detailed engineering studies undertaken in this phase include expanded environmental studies. As information is generated, the original feasibility studies are confirmed or modified. Should significant variances be noted, or should assumptions change, the economic feasibility study is updated, and a decision made to continue or discontinue the project.

The next step in the development phase is the filing of appropriate permit applications. As applications are approved, any modifications or conditions are compared to the detailed project plans, and to other applications. Interagency disputes are resolved and plans modified as appropriate. Upon receipt of all approvals, a final economic evaluation is conducted, and a decision is made to proceed or hold.

There are wide variations, from one county to another, in the amount and type of paperwork required to complete the permit application process. In order to standardize and simplify the process, the Task Force has developed a Universal Permit Application and Environmental Assessment packet (Appendix B) that applies only to mineral exploration and mining projects. We feel certain that the adoption of this, or a similar set of forms, by the foothill counties will 1) prevent misunderstandings and misapprehensions by mining companies operating in more than one county; 2) provide, in one comprehensive package, all information necessary for the decision-making process; and 3) allow faster, more efficient processing of mining permit applications.

EXTRACTION-BENEFICIATION

The extraction-beneficiation phase, or the production phase, includes both the breaking and hauling of ore and any processing or treatment of the ore that is done at the project site.

During the extraction-beneficiation phase, monitoring is conducted to ensure that operations are proceeding in accordance with the approved permits. Production may be interrupted by economic or other factors, such as the curtailment of precious-metals mining that was imposed during World War II. Production may also be halted by exhausting the economic reserves. This means that ore that is economic at higher prices is subeconomic at current prices. The suspension may be long- or short-term. Either an increase in price or significant technological progress is required to place the property back into production at a profit.

The processes, as carried out in open-pit or underground mining, are addressed in further detail in Section VII. Dredging, another form of mineral mining, is not discussed in detail in this handbook. Large scale dredging is not common in the foothills; however, in the infrequent instance where it might be employed, the permit process is the same as that for other types of mineral mining. While a significant amount of recreational dredging takes place, it is conducted on too small a scale to constitute a legitimate mining issue. Dredging operations are under the jurisdiction of the State Department of Fish and Game, and require the filing of a permit application with that agency.

MINING PHASES - SEQUENCE AND DURATION

The sequence of events from prospecting, through construction and operation of a mine and surface plant, to abandonment and reclamation of the site can span a number of years with numerous decision points along the way. The decision points require a "halt or proceed" answer from management, and may be illustrated thus:

* Time	Stages	Decisions to Halt or Proceed
Indefinite	Prospecting	
3 Months to years	Land Acquisition	o
	Target Exploration	o
1 to 3 years	Exploratory Drilling	o
1 to 3 years	Bulk Sampling	o
6 months	Feasibility Studies	o
1 year	Development Planning	o
1 to 2 years	Construction	
5 to 100+ years	Production	
	Abandonment	
1 to 5 years	Reclamation	

* These times and stages are not cumulative, and can overlap. In a large operation, the minimum realistic time from initiation of exploration to production is at least 4 to 5 years, and usually is 8 years.

FIGURE 3. Mining Phases - Sequence and Duration

STAGES OF MINING

STAGE		ACTIVITY	RESULT
PROSPECTING	Area Selection	Literature Search, Reconnaissance Geology, Field Search, Hand Sampling	Consolidate Property Position
	Target Identification	Geochemistry, Geophysics, Geologic Mapping, Examination of Old Workings, Hand Sampling	
EXPLORATION	Delineation	Diamond Core Drilling, Down Hole Hammer Drilling, Reverse Circulation Rotary Drilling, Conventional Rotary Drilling, Churn Drilling (cable tool), Trenching to Bedrock, Sampling	Pre-Feasibility Study
	Detailed Evaluations	Underground and/or Surface Excavation for Bulk Sampling, Pilot Plant Operation, In-Fill Surface Test Drilling, Underground Test Drilling	Feasibility Study
DEVELOPMENT		Underground and/or Surface Mine Construction, Surface Plant Construction (includes Beneficiation Facilities)	
EXTRACTION-BENEFICIATION		Operation of Mine and Plant Facility	

FIGURE 4. Stages of Mining

SECTION IV: LAWS AND REGULATIONS GOVERNING MINERAL EXPLORATION AND EXTRACTION

THE GENERAL PLAN

California State law requires all cities and counties to have a General Plan for the development of various land uses and the management of important resources within the jurisdiction. The General Plan is the jurisdiction's statement of overall land use planning, goals, objectives, and policies, as well as a guide in determining future land uses. In no other form will such a perspective be found. While interpretation of the General Plan is, in many cases, a matter of philosophy, the Plan is intended to be objective.

Most local jurisdictions did not foresee a recurrence of large-scale mineral mining; therefore, existing General Plans do not address the topic in any significant detail. Most Plans to not restrict mining, or designate areas as either suitable or unsuitable for mining. Mining operators, community groups, and private citizens should become familiar with the General Plan to determine if a) mining as a land use is addressed, b) mining is restricted in any manner, and c) it is required to meet standards of compatibility with surrounding land uses. Even lacking specific mining standards, the General Plan usually will include related standards, especially regarding noise.

Decision-makers frequently are approached outside the context of a particular application. Individual views may then change during the public hearing process. Views may also change as a result of greater understanding of, and familiarity with the proposed project and environmental document. Consequently, as the mining issue becomes increasingly a point of controversy in various jurisdictions, the General Plan assumes more and more authority in determining the acceptability or nonacceptability of a specific proposal.

Moreover, the General Plan brings to the decision-making process a continuity that may otherwise be lacking. For example, a mining proposal proceeds through multiple phases from the original point of interest to actual mine construction. During this period, local elections may change the structure of decision-making bodies, resulting in new or different philosophies among these persons. However, if the General Plan is not amended, the Plan remains as the basis of the jurisdiction's perspective, attitude, and approach to the question of compatibility in land use issues.

Although in practice a series of decisions on a particular type of application can lead to policy by action, it is advisable to effectuate policy change at the General Plan level rather than within the context of an individual land use application. Furthermore, the general public should be involved in determining major amendments and comprehensive updates of the General Plan. If the Plan does not address specific issues, or if it is in need of change, the matter can be brought to the attention of the decision- makers.

ZONING

Zoning regulations establish permissible land uses throughout the local jurisdictions, and vary widely from one area to another. The local jurisdiction determines whether to allow commercial development on all city streets or to limit this type of development to specific areas. Zoning regulations also control the placement, height, bulk, and coverage of structures within each of the districts.

Certain land uses do not fit the zoning categories and districts. The Conditional Use Permit was devised to permit the community to examine, modify, exclude, or so restrict as to deny, those uses that may create problems.

According to the jurisdiction's zoning ordinances, a mining company will be required to obtain a Conditional Use Permit, apply for a change in zoning to a district that will allow mining, or abandon the mining project.

CALIFORNIA STATE AND LOCAL MINING REGULATIONS

California's Surface Mining and Reclamation Act (SMARA) establishes a state-wide policy for conservation and development of mineral lands in California, as well as requirements for a permit and reclamation plan approval prior to conducing surface mining operations in the State. Under the Act, there is no distinction between exploration and actual mining. Activities below the threshold defined in the Act are exempt from regulation; those exceeding the threshold are regulated. These regulations require the mine operator to obtain mining permits from local county governments prior to initiating work.

SMARA is designed to be implemented primarily by individual counties' lead agencies; consequently, there are differences in its execution from one county to another. Because the principal authority resides in the local jurisdictions, the permit process for mineral exploration and mining in California is a complex matter. Mining companies are advised to ascertain locally pertinent regulations and to begin negotiations early in the project planning process, in order to avoid delays and misunderstandings.

In addition to SMARA, counties and other local jurisdictions have enacted various zoning and land use ordinances. Under these ordinances, exploration and mining may be considered a use by right, a conditional use, or may be prohibited altogether. The mining company must contact the local planning commission to confirm the conditions placed on exploration and mining in a specific zone.

In some counties and cities, certain exploration activities can be conducted under exemptions; however, contact should be made with local agencies to determine the exemption status. Similarly, mineral exploration bore holes are exempt from the California Department of Water Resources Water Well Standards; however, certain other wells which may be drilled in a mineral exploration program may be regulated by the Standards. Individual counties and other local jurisdictions may adopt the States's program or institute a more stringent one. Again, the mining company must contact the local authorities to assure compliance with local standards and/or regulations.

SURFACE DISTURBANCE REGULATIONS

Article 1 of the State Surface Mining and Reclamation Act exempts certain exploration and mining activities, including:

a) Excavations or grading conducted for farming or on-site construction or for the purpose of restoring land following a flood or other natural disaster.

b) Prospecting for, or the extraction of, minerals for commercial purposes and the removal of overburden in total amounts of less than 1,000 cubic yards in any one location of one acre or less.

c) Surface mining operations that are required by federal law in order to protect a mining claim, if such operations are conducted solely for that purpose.

d) Such other surface mining operations which the Board determines to be of an infrequent nature and which involve only minor surface disturbances.

Because of exemption (b), many traditional exploration operations such as drilling, limited trenching, and limited bulk sampling are not subject to the Act. Additional exploration activities may be exempt from the Act when the operator is performing these activities as annual federal assessment work as defined in exemption (c).

It is the belief of the Task Force that exemption (d) was included in the Act to permit legitimate exploration activities on fee lands that is not permitted under exemption (c). In this case, we recommend application to the State Board of Mines and Geology, explaining the nature of, and necessity for the exploration, measures to be taken to keep surface disturbance to a minimum, and stressing the infrequency of the exploration activity.

Note that the Act does not differentiate between mining and exploration activities. There are no special provisions for prospecting or exploration under the Act. If any activity is not exempt, then a complete mining permit application is required.

In many jurisdictions, local regulations require that the mining company file an application for a conditional, special, or temporary use permit before initiating exploration activities. The application process for a use permit is not usually complicated. However, the permit approval process requires consideration of environmental impacts, as prescribed by the California Environmental Quality Act (CEQA), a process that may require two to four months, and may result in public hearings. If there is significant local opposition to the project, the hearing process may be both lengthy and expensive.

In addition to land use controls, some California counties have adopted ordinances which apply to exploration operations. These include land clearing, grading, and erosion control ordinances, and are intended to provide control over the removal of vegetation and the attendant potential for erosion.

DRILL HOLE INSTALLATION REQUIREMENTS

The State of California Department of Water Resources has promulgated water well standards which regulate the construction and destruction of water wells. According to members of the Department staff, these regulations do not apply to mineral exploration bore holes; however, they may apply to other classes of wells which are sometimes included in mineral mining programs. The basic types of wells associated with mining are:

Observation Wells - These are constructed for the purpose of observing and monitoring groundwater conditions.

Test Wells - These are constructed to obtain the information needed to design other wells. Test wells are cased, and can be converted to observation or monitoring wells, and under certain circumstances, to production wells.

Test Holes and Exploration Holes - These are temporary, usually uncased excavations used for the immediate determination of existing geological and hydrological conditions.

The Water Well Standards include regulations which apply to the construction, alteration, and destruction of water wells. Their application to mining wells and holes is summarized as follows:

CATEGORY	CONSTRUCTION	DESTRUCTION
Test Holes and Exploration Holes	Not Applicable	Applicable
Mineral Exploration Bore Holes	Exempt	Exempt
Observation and Monitoring Wells	Applicable	Applicable
Test Wells	Applicable	Applicable

Note that construction, alteration, and destruction of regulated wells must be performed by licensed contractors. Additionally, the California Water Code, Division 7, Sections 13750 through 13755, requires that reports be filed with the California Department of Water Resources for applicable work on nonexempt classes of wells.

In addition to State standards, local jurisdictions are free to adopt their own well standards. As of December 1981, 33 of California's 58 counties had adopted ordinances more stringent than the State's Water Well Standards, and six other counties had adopted ordinances which regulate certain classes of wells. Additionally, one-third of California's 429 cities have adopted well ordinances which are usually administered by the local Environmental Health Department. It is unknown how many of these local ordinances affect mineral exploration bore holes. It is the responsibility of the mining company to investigate the effect of local ordinances on a specific program.

SURFACE ABANDONMENT

SMARA does not regulate abandonment of any operation that is exempt from the Act. However, SMARA-exempt operations may be regulated by local jurisdictions. If this is the case, surface abandonment must conform to local agreements.

For those projects which are exempt from federal, state, and local regulation, surface abandonment should be in accordance with good management practices and negotiations with the surface owner.

The operator should give particular attention to the proposed disposal of spent drilling fluids and cuttings. Proper disposal of these materials is receiving increasing attention from the various regional water quality control boards. Although proper disposal is a matter of subjective determination by individual area engineers, commonly accepted practices include: containment at the drill site in a mud pit; drying; covering with soils or other native materials; and revegetation. Excess cuttings can be either buried or thinly spread and raked over the surface. The primary consideration is protection of the disposal site from erosion or leaching which would allow cuttings and muds to enter ground and surface waters.

Appendix C is a comprehensive list of federal, state, regional, and county agencies that address mining issues and concerns. Private agencies and consultants on various aspects of mining and related subjects can be found in the classified section of the telephone directory.

SECTION V: ECONOMIC CONSIDERATIONS WITHIN THE COMMUNITY

The impact of mining on the local economy is a topic of much debate, with opinions differing according to the perspective of the speaker. The mining company stresses the millions of dollars and the jobs that will accrue to the community from the venture. Opponents counter with predictions of declining property values.

The Mining Task Force offers several factors for use in measuring the cost or economic benefit to the community from mining operations. The final decision, of course, rests with the community and its officials.

Regardless of the size or complexity of a given project, there are certain elements common to all mining operations: Employees, payroll, products, local sales taxes, multiplier effects, property taxes, and capital investment in equipment. These elements, which can be expressed in concrete figures, are tangible factors that can be objectively analyzed and evaluated.

Other factors that are less tangible include population changes, mining profits, local public service impacts, short-term jobs, value and attitudinal judgements, and effects of mining on land values and local employment levels.

An analysis of the economic impact of a gold mine on the surrounding community will address the following areas:

Annual payroll

Percent of total workforce to be hired locally

Dollars injected into local economy from workforce

Dollars injected into local economy through sales of supplies, equipment

Sales tax revenues accruing to the State

Property tax revenues accruing to the local jurisdiction

Cost to local jurisdiction for increased use of public services

Long term effect of increased housing development

A well-organized mining company will have payroll-employment-capital outlay information available prior to applying for a mining permit. Lack of such data may reflect lack of effective organization and planning, and would indicate a need for close scrutiny of the proposal by local officials.

A key factor in the mining issue in the Sierra foothills is the effect of mining on land values. Lake County has experienced conversion of vacation cabins to year round occupancy as a result of the influx of workers to The Geysers geothermal area and the construction of the Homestake McLaughlin Gold Mine. The availability of this rousing resource has buffered the impact of these projects on housing costs. Rental rates appreciated approximately 25% during the eighteen month construction period of the gold mine, but remain low relative to adjacent counties. Conclusion of the construction phase of the mine has resulted in a commensurate decline in rental costs.

In both Napa and Lake Counties, Homestake's McLaughlin Mine has created substantial appreciation, in some cases 100% to 200%, of surrounding land values, as a result of improved road access and the availability of power sources which were previously lacking in the area.

In addition, the McLaughlin Mine has stimulated dramatic economic growth in the southern portion of Lake County. Significant positive impacts include increase in local employment and corresponding reduction of unemployment rates; ten percent reduction in welfare rolls; increase in sales tax revenues; increased income to local business firms; and increased property tax revenues. The multiplier effect of local payroll and purchases, which has been substantial, is currently being documented in a report which will be available later this year.

The California Nickel Company has proposed a large mine in Del Norte County; however, the isolated location of the project and lack of adjacent private lands prevents possible devaluation of land.

Inquiries into this matter by the Task Force staff reveal that no definitive studies have been done to determine the effect of mining operations on land values in residential areas, where the homes are relatively new and/or of significant value due to the rural environment.

The following analysis from a Draft Environmental Impact Report covering mining projects in the foothills illustrates the problem.

> "The effects of the exploratory program on surrounding property values are difficult to measure. The determination of whether properties will devalue as a result of exploration cannot be predicted without conducting a thorough analysis of similar situations in the Mother Lode counties. However, such a study cannot be made because there are no similar situations in any of these counties...As a result, many opinions were sought from local appraisers, lending institutions, and county planners in the Mother Lode area. A majority of the persons surveyed felt that there could be a decline in property values, but due to the many variables and unknowns, it is impossible to measure. Many of the respondents stated that if project impacts are mitigated to acceptable levels there would not be an effect on property values in the vicinity of the mine sites. However, many of those surveyed felt that property values could be affected, but it would be in anticipation of a full scale mining project, not as a direct result of the exploratory proposal. The observation was made that people tend to be apprehensive of the unknown and will react prematurely, thereby putting their homes up for sale and contributing to a real estate market in which the present supply of houses exceeds the present demand.
>
> Following is a summary of the interviews conducted with six appraisers with businesses in the Mother Lode area:
>
> > Loans would still be granted if value decreases; however, lack of well water would destroy the value of the property.

> The loan value is based on a percentage of appraised value...The bank would look at homes that have been selling.
>
> General consensus of bank appraisers is that homes could become less desirable and there could be less demand for housing in the vicinity of the mine sites.
>
> There is more noise and traffic during full-scale mining operations.
>
> It is necessary to research other areas with a similar situation to adequately address the issue. It must be proven that devaluation was caused by the mining project. This type of analysis would take several months.
>
> The mine site is a prime location to have a house, in the perception of outsiders, but local residents consider the area to be above the snowline and therefore too expensive to heat in the winter. There may be a decline in property values, but this is too difficult to measure. A decline in values may occur due to anticipation of a full-scale mining project. There is a present glut of homes on the market, and people are selling homes at the site because of high heating costs.
>
> Property values may become depressed if there is significant noise and vibration from the project. The bank will lend money, even though values may decrease.
>
> There would be no loss in value for the exploration program, unless the water supply is depleted or reduced to low levels. Currently it is a buyers' market, with the real estate market flooded and home values decreasing.
>
> If truck traffic is doubled, and the home is adjacent to the roadway, property value may be affected.
>
> If impacts from the exploration project are mitigated and a tightly monitored program is implemented, there should be no effect on property values. The anticipation of full scale mining may have an adverse effect, causing many people to put their homes on the market."

Planners in the counties of Sierra, Del Norte, Tuolumne, Amador, and El Dorado were interviewed in an attempt to identify a mining project with land use issues similar to that of the proposed project. The results were inconclusive, as the following summary of the replies indicates.

> In Sierra County there have been no mining projects located near residential areas. All mining has occurred in desolate areas.
>
> In Del Norte County there have been no homes immediately adjacent to a mine site. It was determined that by mitigating all physical impacts, property values would not be affected.

> The owners of the Sonora Mine must buy out the homes that are affected by the open-pit mining operation. Problems have occurred between the mining company and homeowners in agreeing on an equitable settlement.
>
> Impacts will not be as great from an exploratory mining proposal as from a full scale mining project. The applicant should be responsible for off-site impacts such as supplying homes with an alternate water supply, providing insurance against any claims by homeowners as a result of the exploration program, and posting a bond.
>
> Mining companies are not required to obtain permits for exploration. They are required to file a mining reclamation plan. If the plan meets County requirements, exploration is permitted. There has been no effect on property values.
>
> It is almost impossible to determine the effects to property values during the exploration phase. There is no way to determine this until second stage (full scale mining). The anticipation of full scale mining may create devaluation...If the impacts from exploration have been mitigated, the project cannot affect property values.

Obviously, this is an issue that cannot be resolved by the application of facts or figures, since the necessary data has not yet been developed. Note, also, that the report quoted here deals only with the exploratory phase of mining, and does not address the effects of full scale mining.

If full scale mining should proceed, a detailed, in-depth analysis of effects on property values should be conducted, either by the County Appraiser or by an independent consultant retained by the County. It may be determined that the mining company would have to purchase those properties that are directly affected by a full scale mining operation. An example of this occurred in Tuolumne County with the Sonora Mine. In Napa County, no requirement to purchase surrounding properties was applied to Homestake's McLaughlin project. The Napa County Land Use Permit required that Homestake defend the County from any nuisance suits filed by neighbors; however, no such suits have occurred.

It is the task of the planning commissions to scrutinize mining proposals very closely, evaluate carefully any evidence that becomes available, and take all possible precautions to protect the interests of the community and local residents.

Property buyers in the foothills should research carefully to determine population, business, and industrial trends in the area. They should spend time, prior to land or house purchase, talking with owners of local business establishments, residents, and county/city officials. Questions regarding mining, logging, residential and industrial development, freeways, and airports are legitimate concerns, and should be answered in a satisfactory manner before the prospective resident makes a major financial investment in land or housing.

Another area of investigation for prospective land buyers is ownership of mineral, water, and timber rights. Ownership of resource rights is often difficult to establish. If ownership is not indicated in the deed to the property, it is often necessary to engage the services of a title company to search the chain of title to the land to determine ownership.

To confuse the situation further, mineral rights to a certain depth, as fifty feet, may be included in the title, while rights below that depth are retained by another party. In areas with resource-based economies, such as the foothills, thorough investigation of resource rights is strongly recommended. The responsibility for this research and determination rests with the individual property owner.

The mining company has a responsibility, also, to offer homeowners and local officials adequate assurances, in the form of mitigation measures and reclamation plans, that nearby residents will not be unduly disturbed, and that land values will not be jeopardized by the proximity of the mining operation.

SECTION VI: PUBLIC CONCERNS

Mining issues involve many difficult land use decisions. Elected/appointed officials are responsible for weighing the evidence and asking pertinent questions. The future of the county, economy, environment, and constituents must be included in development considerations. Citizens are concerned with property rights, businesses with profit, and planners with zoning constraints. Our democratic process requires the involvement of many groups in making decisions. The process begins with elected officials such as county supervisors and city council members, who are the final decision-makers. These officials appoint members to planning commissions, which in turn are staffed by professionals, including planners and engineers.

There are other groups concerned with mining. The business sector is interested in the economic benefits of development. Technical people such as hydrologists, geologists, traffic consultants, reclamation specialists, landscape architects, and mining experts provide much of the information on project feasibility. Technical personnel are employed by both government and private industry as consultants.

Local decision-making includes three general areas: Planning, technical information, and a process for making determinations. Through the permit process, counties and cities have developed a process for making decisions on development issues, utilizing these areas along with the groups involved. The system is workable, flexible, and consistent with the democratic ideals of our society.

The groups involved in mining issues, including elected officials, planners, private citizens, and mining companies. Ideally, these groups are equal and have equal input into the decision-making process. Occasionally one of the groups has greater influence or importance to the community and the situation changes, skewing the final outcome of a question.

At this point it may be wise to define a "special interest group." This term has been used widely, and usually pejoratively, by many individuals to describe those they view as opponents in mining controversies. A special interest group is simply a group of individuals, organizations, or agencies whose interests in any given matter are similar. Thus, while mining operators comprise a special interest group, so do members of a homeowners association, as well as members of a planning commission or planning department.

The special interest groups most concerned with mining operations are mining companies and homeowners. These groups often hire consultants and attorneys to represent them because such specialists have a broad understanding of the decision-making process, and are often able to influence it.

ELECTED/APPOINTED OFFICIALS

Elected and appointed officials deal with the most difficult aspect of mining permits: the approvals or denials. Like any land use issues, the various parties frequently hold conflicting views. The Boards of Supervisors, City Councils, and Planning Commissioners have the task of dealing with a project that might be unpopular with constituents. The Supervisors and Commissioners often try to reassure the public regarding the local impacts of development projects.

How does the public decision-maker, i.e., the Supervisor, Councilman, or Commissioner, rationalize a project such as mining? The individual is placed in office as a community leader. He/she realizes that anything involving development, growth, or the possibility of environmental degradation will certainly arouse objections in the community. Review of projects must be consistent and comprehensive, and information supplied by staff members must be factual in order for valid decisions to be made.

Most counties deal with mining proposals through the permit process. The mining company files application for a use permit, and works with the county staff to develop the required paperwork and schedule a public hearing before the Planning Commission.

At the hearing, the Planning Commissioners weigh the evidence presented. Citizens and groups make presentations to sway the Commission into an approval or denial vote. The Commission must listen to the testimony and the staff's discussion of the project, and make a determination. This is seldom simple, and sometimes tentative decisions are the result. For example, approval, with a multitude of attached conditions, may preclude a project from going forward.

Locally elected officials normally do not have an active role in the permit process. This has been delegated to the Planning Commission. If an appeal is lodged regarding a Commission decision, the normal sequence of events calls for the Supervisors to re-hear the application. At this point, the Board will review public testimony and the Planning Commission's decision. The Board of Supervisors will make the final decision. This completes the process.

CITIZENS AND CIVIC GROUPS

Citizens and civic groups may voice valid concerns regarding mining practices and procedures. Many people, when mining is mentioned, visualize past mining activities in the foothills, or coal strip-mining in the eastern United States. Such perceptions, with their visions of scarred landscapes and unsightly tailings, create public concern regarding the environment. Other public concerns fall into the following categories:

- Economic Impacts
  Will this project devalue nearby property or affect tax assessments?

- Increased Noise Levels

- Increased Traffic on Local Roads Near Mine Sites
  Can rural roads carry the burden of frequent usage by heavy trucks and mining equipment?

- Water Quality and Quantity
  Will de-watering (pumping accumulated water from old mines) decrease the water levels in local residents' wells?
  Will mining activity cause pollution of local surface and groundwater supplies?

- Air Quality
  How much dust and other pollutants will mining create in the local atmosphere?

Procedures for notifying property owners and the community at large regarding development proposals have been severely criticized. The extent and timeliness of such notification is specified by State and County regulations; however, private citizens often feel that the information is neither timely nor adequately disseminated. One solution is a change in notification procedures, clearly identifying the various types of rights (mineral, water, timber), and assuring notification of proposed activity to owners whose property abuts affected areas.

In addition, provisions should be made for civic and community organizations to register with local officials, with the request that information and copies of proposals affecting their areas of interest be provided on a routine basis. Such registration should then be actively encouraged by local officials.

TECHNICAL AND PROFESSIONAL CONSULTANTS

Because this is such a complex process, the involvement of persons with mining expertise is essential. From the search for a mineral deposit to the final reclamation process, technical personnel employed by public and private entities perform many vital operations. Professional people such as lawyers and planners also guide the process and offer advice. Misconceptions often exist in the public and private spheres regarding the intent of these technical and professional people. Less-than-professional conduct and conflicts of interest are typical charges often levied against them. The professional/technical expert may find it difficult to maintain his/her integrity, and to appear believable and objective.

In evaluating the opinions of these experts, it is useful to ask a few pertinent questions:

What are the expert's credentials?
What experience does he/she have?
Is he/she familiar with the characteristics of the community?

If these questions are answered satisfactorily, it may be safe to assume that the expert is providing valid, objective information. It is important to note that the public hearing process does not normally require facts and/or oaths. Many things that may be discussed are unverifiable. Those involved in the process should have done adequate research to arrive at a thorough understanding of the situation before either accepting or discounting the expert's opinions and statements.

BUSINESS INTERESTS

The business sector is oriented toward the profits of a mining venture. The profit motive is the strong incentive to develop potential mine sites. However, businesses also understand local concerns and community interests. The time is past when a company with money, power, and jobs for the community has the final word on mining projects. The modern decision-making arena is multi-sided.

RESOLUTIONS

There are a number of procedures that can be employed to resolve mining controversies, or to forestall such controversy. The California Environmental

Quality Act (CEQA) is a tool that can be used to bring out information on which to base decisions. CEQA should be utilized in mining controversies to evaluate the before-and-after effects of mining, to identify project impacts as well as mitigation measures, and to discuss project alternatives.

The referendum/initiative process is available to citizens who wish to bring the mining issue to a vote by the public. This process has been used at least once in the foothills area in recent times.

Environmental mediation is a recent technique that has been used effectively to settle disputes that involve environmental interests and development. The process involves negotiation among the various groups to reach a consensus on the project's merits. Mediation of disputes requires skill in sitting down with opponents and working out details. Under our system, the forum for these discussions is often the Planning Commission hearing, but mediation can take place elsewhere.

We strongly recommend that the mediation process be expanded and refined into a more effective system. Knowledgeable, independent mediators should be engaged, and efforts made to focus on real issues of concern. The system should have as its goal the establishment of a consensus among the opposing factions.

The mining operator can help dispel public mistrust and suspicion with a candid, forthright disclosure of the details of the proposed operation. Concerned citizens want to know the extent and duration of the activities and the potential impact on the quality of day-to-day life in the area. It is important, also, that the mining company present suitable reclamation plans for the mine site. Local residents are justifiably apprehensive about the after-effects of a mining project, but a well-conceived reclamation plan, together with assurances of its execution and completion, may make the situation less repugnant and decrease public opposition to the venture. Furthermore, the promise of a mined-over site being transformed into an area that may actually increase land values may be an inducement to accepting the project.

Private citizens historically unite at any sign of a perceived threat to their community. Responsible surveillance of the planning and permit process, however, is an on-going activity. It is important for citizens to realize that basic land use zoning is in place before specific projects such as mining are proposed. County and city planning departments and commissions, one after the other, report an overwhelming lack of public interest in their deliberations. Until a controversial issue arises, local planners and officials have little or no ideological guidance from the community other than the General Plan.

The appropriate time for citizens to become involved in land use issues and the planning process is before controversial projects are proposed. If public officials are kept apprised of the general attitudes and wishes of the community, it will be easier for them to assess the merits of any land use proposals brought before them.

SECTION VII: PROBLEMS - PREVENTION AND MITIGATION

This section presents a discussion of problems that commonly exert a negative influence on the acceptance of mining operations by communities, local residents, and those concerned with environmental issues. These problems represent a valid, concrete impact by mining on the community and the environment; however, it is essential that careful consideration be given to the preventive and mitigation measures that can be employed to alleviate the problems and minimize negative impacts.

Two areas of caution must be noted. The mining company must have the financial means and/or guarantee to implement mitigation measures before the need for such measures develops. In addition, the concerns of local residents regarding a proposed project must be considered. The local permitting agency will not want to incur the liability of replacing domestic water supplies, for instance, should wells become polluted or dry.

Performance security can help a great deal to allay public apprehension regarding the mining operator's adherence to sound mitigation and reclamation measures. Performance security may consist of a performance bond posted by the mining company, a cash deposit that can be attached by local officials and used to finance corrective action, or other acceptable assurances.

WATER

This area of mining requires extensive preliminary study and careful in-progress monitoring to preclude degradation of water quality and quantity. Careful planning, together with mitigation measures and sound maintenance programs, assures that water quality standards can be maintained during and after mining operations.

A thorough hydrological study of the area to be mined must be accomplished before operations begin and continued throughout the mining process. The hydrologist plays a key role in advising the local jurisdiction and the mining operator of the hydrologic impacts that may result from mining of the area, and of the area's reclamation potential. This information will appear in the overall mining plan.

A thorough hydrological study includes the study of surface and subsurface water systems in terms of water quality, the amount of water passing through the systems, who has a right to the water, and the potential effects of mining on timing and delivery of water, water channels and wells, lake shores, and lakes. Also, the current uses of the water and the possible future demands that will be placed on the water source after completion of the mining operation must be considered.

A chemical analysis of the soil and rock of the area will determine the presence of heavy metals and other potential pollutants that could be released into the water through mining. Physical features of the area, such as watersheds and watercourses, can be determined from topographic maps and site surveys. Runoff can be estimated by various methods, as described in the USDA Soil Conservation Service Engineering Field Manual. Utilizing the results of the hydrological study, mining operators can design mitigation measures and maintenance programs.

Understanding that water quality is related to drainage of the site and the type of material on the site provides the key to water pollution control. Water leaches materials from the soil and rock through which it passes. Soil and mine tailings containing such elements as copper, zinc, or lead produce chemical pollution in the water. Soil and tailing materials themselves constitute a pollutant when they are washed into the drainage system. Fine-grained materials such as clay and silt create turbidity in streams and rivers, while coarse-grained sand and gravel fill in channels and reservoirs, and can cause flooding. The basic concern of controlling water pollution in mining operations, therefore, is keeping the water, whenever possible, out of the mining site and keeping water that comes into contact with mined material contained on the site and out of the drainage system.

The following measures can be integrated into an effective system of water pollution control:

1. Plan the development to fit the particular topography, soils, waterways, and natural vegetation at the site.

2. Expose the smallest practical area of land for the shortest possible time.

3. Apply soil erosion control practices as a first line of defense against on-site damage.

4. Apply sediment control practices as a perimeter protection to prevent off-site damage.

5. Implement a thorough maintenance and follow-up operation.

There are various methods for preventing water pollution. Dikes and swales form settling basins where material suspended in solution will settle out, and clean water can be released. These settling basins can also be used to recycle wash water from the site.

Leachates of elements which may compromise water quality must be retained on-site and treated to remove the toxic elements. Treatment systems can be complicated, and usually require a high degree of maintenance. Designing water control structures and chemical removal systems usually requires consultation with specialists in such matters.

If on-site water is to be discharged into the natural drainage system, a surface water monitoring program will be required. The specific monitoring system will depend on the materials being monitored, and the frequency of discharge.

While surface waters can be easily monitored and tested for degradation, pollution, and depletion, subsurface waters must be monitored by very technical methods. The Task Force recommends groundwater modeling as a useful means of water quality and quantity evaluation. Modeling is an analytical tool which applies known factors to hypothetical situations and extrapolates the effects to predict possible outcomes.

A groundwater model will monitor effects of dewatering and groundwater pollutants. The basis for the model is data collection, before, during, and after the mining operation. Placer deposits and hardrock relationships must be identified as a basis for data collection. The hydrologists hired for this purpose must have sufficient knowledge of the geology of the area to design an appropriate model. The model should include a series of sampling wells drilled in strategic on- and off-site locations in and around the proposed mine site. Any existing wells in the area, such as those at nearby residences, should be monitored. Sampling wells could also be placed between the proposed mine site and any residences with reasonable distances.

A minimum of one year's data must be gathered and analyzed prior to project start-up, in order to observe the complete yearly water cycle, including seasonal fluctuations.

Mines are located in various geological areas, and the operational methods and target minerals may differ. Therefore, the development of a basic model for each situation will allow a project to be monitored and specific situations to be addressed as information is developed and impacts are discovered.

By utilizing various testing techniques, such as draw-down tests, the hydrologist can establish a data base. A log of all wells should be maintained to organize and track data over the course of several years' mining operations. Monitoring and testing schedules and recordkeeping must be consistent.

The model and monitoring schedule should be designed to give public agencies, the mining company, and the county adequate lead time to react should a problem arise. The model will yield sufficient data to determine in advance if water quality is being degraded, if local wells are being affected by de-watering, or if the general water table is dropping.

Mitigation measures may include:

1. Acquisition of a bond to assure that financial means are available to deal with water quality/quantity problems.

2. Agreements to truck in water until a permanent water source can be provided.

3. Redrilling or installation of new wells, if necessary.

4. Provisions whereby the mining company will provide expansion of the services of an existing utility company into the affected area, or will form a utility company to furnish water to the area, should either measure become necessary.

NOISE

A major concern in the mining issue is the generation of excessive noise in nearby residential areas. Noise has come to be classified as a pollutant, along with more commonly recognized pollutants such as toxic materials in the air and water. Noise standards have been developed and are incorporated in most General Plans. Objective, scientific tests have also been developed for determining acceptable noise levels; however, noise perception is basically a subjective reaction.

In a mining operation, the noise problem becomes quite complex, involving, besides basic noise level, such factors as time, specific sources, and relative changes in noise level. A working couple, for example, may accept the operation of bulldozers and backhoes during the hours they are away from home, while a family with small children almost certainly will object to these operations, especially during the children's nap time. And, while mining operations can and often do continue throughout the night, no one in the surrounding area will appreciate noise levels that interfere with sleep.

There are three distinct noise-producing phases of a mining operation: exploration, development, and production/beneficiation. In some instances, these phases will overlap. In each case, diesel powered equipment is a major noise source.

Exploration involves the use of earth moving equipment: backhoes, front loaders, and bulldozers, along with heavy trucks to transport the excavation equipment.

Exploratory drilling operations consist of drilling multiple test holes. The primary sound source is the engine used to power the drill. The highest noise level will occur during actual drilling operations, though other sources include pulling the drill string to remove core samples, adding drill pipe, and performing repairs and maintenance on the drill rig. The use of high pressure air to clear the hole will result in the sound of released air pressure.

Blasting may also be employed to loosen or remove surface materials. Subsurface blasting, while not usually expected to create airborne noise impacts, may generate ground-borne shocks which could result in structural damage. Surface blasting, however, is more likely to startle anyone not expecting the blast than to cause physical damage. The amplitude of a surface blast is dependent on various factors, including the amount of explosive used, placement of the charge, and atmospheric conditions such as wind velocity and temperature.

The development phase of mining entails construction of buildings and the physical mine plant. This is similar to the construction of other commercial or industrial plants, involving the same equipment and procedures familiar to most people, as well as the same noise impacts.

The production phase usually is carried out underground or on the surface in open-pit quarries. Underground mining elicits less public opposition due to noise. Open pit mining, however, produces more noise because the noise sources are at or above ground level, and because surface blasting is often employed.

Noise sources from underground mining activities include heavy equipment, ventilation fans, and other equipment such as generators or compressors situated at ground level. Noise levels from ventilation fans vary, depending on fan size and design, and the location and type of fan enclosures. Noise from generators will vary with engine size and housing design. Ventilation fans and generators will normally be in operation whenever workers are present, and possibly 24 house per day. Air compressor operation may be intermittent, depending on specific use and subsequent demand.

Blasting may be employed in initial shaft excavation. Once underground mining is underway, however, airborne noise from the mining itself is not usually a major concern. Ground-borne vibration due to underground blasting remains as a possible impact until sufficient depth is attained that the blast is attenuated by the earth.

Noise and vibration impacts from open-pit mining may be generated by the use of blasting to remove surface materials; however, some open-pit operations do not employ blasting but remove such materials by ripping with bulldozers or other suitable heavy equipment. Blasting remains the activity most likely to evoke public reaction because of the potential for air blast or ground-borne vibration.

Beneficiation, or processing of the mined materials, may be performed on- or off-site. In some cases, the excavated ore will be crushed on-site, using jaw crushers of varying sizes, then further processed using a ball mill to produce a finely ground ore for washing or chemical processing. The high-grade ore may then be removed from the site in trucks, or further processing may be performed on-site.

Major noise sources associated with beneficiation operations include loaders dumping material into hoppers, jaw crushers, the ball mill, and related generators and air compressors. Noise generated by dumping varies with the type of material and the design of the hopper. Dumping operations are usually brief, and are best described as single noise events, rather than sustained noise levels.

The noise from jaw crushers also varies, depending on the type of material being crushed, the type and size of motor, and the size of the crusher jaws.

A ball mill creates noise from the crushing mechanism, air relief valves, and the hopper. Again, this noise depends on the size of the mill and the material being processed. Ball mills are often completely enclosed.

Chemical processing and washing machinery usually does not generate noise at a significant level; however, noise is produced by the generators and/or air compressors used to operate the machinery.

Truck traffic is a major source of noise during mining operations. Heavy trucks are used to transport earth moving equipment to and from the site, and to remove material from the site. Lighter trucks may be used to haul high-grade ore materials from the site.

Noise Controls

Noise exposure at receiving noise-sensitive properties, in this case nearby residences, is regulated by local noise control ordinances or by the standards of the Noise Element of the General Plan. Community noise regulations vary from one jurisdiction to another, but generally are intended to abate noise nuisances and to control noise from existing fixed noise sources. The Noise Element of the General Plan is primarily a planning tool, and is not usually enforceable after a land development has been approved. Specific noise sources can be controlled by the adoption of Noise Ordinances based on the Noise Element of the General Plan, or individual standards can be affixed by means of a discretionary permit.

The California Department of Health Services Office of Noise Control (ONC) has prepared a Model Community Noise Control Ordinance, as has the U.S. Environmental Protection Agency (EPA). The EPA has prepared guidelines for community noise exposure in the publication Information on the Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. The ONC has developed Guidelines for the Preparation and Content of Noise Elements of the General Plan, which includes recommended exterior and interior noise level standards for local jurisdictions to apply in identifying and preventing the creation of incompatible land uses due to noise.

The ONC guidelines contain a land use compatibility table which describes the compatibility of different land uses with a range of environmental noise levels. Recommendations include the application, under certain conditions, of more restrictive standards than the maximum levels cited. As an example, the standards for quiet suburban and rural communities may be revised to reflect lower existing outdoor noise levels.

As in the case of noise control ordinances, Noise Elements vary from one jurisdiction to another. The ONC guidelines provide some indication of acceptable levels for residential land uses, as does the EPA Levels Document.

Other factors should be considered in establishing criteria for noise sensitive land uses. For example, sounds with noticeable tonal content such as whistles, horns, or droning or high-pitched sounds may be more annoying than the actual sound level suggests. The effects of unusual tonal content will generally be of more concern at night, when residents may notice the sound in contrast to previously-experienced background noise. Many noise standards apply a penalty or corrective requirement to such sounds.

Because many rural residential areas experience very low noise levels, virtually any change in local activities or in local land uses will cause an increase in noise levels. This fact should be considered in the planning and environmental review processes. While audibility of a new noise source and/or increases in noise levels within recognized limits are not usually considered to be significant noise impacts, the ear is the final judge of what is significant.

Control Techniques

A variety of noise control techniques can be employed in mining and exploration projects. Whether a particular measure will be effective for a given project will depend on the actual sound levels produced by the source, its location and orientation, topographic shielding, atmospheric effects, and the locations of nearby residences. For projects where all pertinent variables cannot be readily addressed, it is often appropriate to establish noise performance standards based on local noise control ordinances of the Noise Element, incorporating the concepts of curfews or more stringent nighttime standards where appropriate. Selection of specific control measures may be the responsibility of the project operator, who must satisfy the standards for acceptable noise exposure at nearby properties, or the control measures may be mandated by the local jurisdiction. Following are examples of appropriate noise-control techniques.

Blasting - Noise and vibration from blasting can be minimized by controlling the size and placement of explosive charges and by using sequential blasting techniques. Charge size should be the minimum required to remove the desired material, and delay detonators should be used. The project operator or the blasting contractor should perform the necessary calculations to demonstrate that the amplitudes of air blasts and ground-borne vibration will be within acceptable limits, considering ground impedance, atmospheric effects, and other variables affecting sound and vibration transmission. Blasting should be limited to daytime hours to minimize sleep disturbance. It is advisable to announce a blasting schedule to reduce the startle response in neighboring areas.

Engine Powered Equipment - Mufflers and acoustical enclosures should be maintained in good working order on all heavy equipment, trucks, air compressors, generators, and other engine-powered equipment. No modifications of mufflers, exhaust systems, or other sound-attenuating features should be permitted. On-site truck and heavy equipment routes should be selected to avoid nearby noise-sensitive areas. Noise barriers may be considered for areas of intensive heavy equipment or truck use, such as material dumping or loading areas. Excessive noise from fixed equipment such as generators or air compressors can be reduced by the use of barriers or enclosures.

Drilling Rigs - Drill rig engines should be provided with adequate mufflers, and all noise attenuation devices fitted by the manufacturer should be maintained in good working order. Drill rigs should be located to take advantage of the shielding offered by local topography. Noise barriers of hay or straw bales are effective in providing shielding, where necessary, to block line-of-sight to nearby property, and will provide some absorption of reflected sound as well. Exhaust outlets of the drill rig engines may be routed below the tops of barriers or behind natural shielding features. Figures 5 and 6 illustrate, respectively, a typical drilling rig and one method of noise shielding.

Other Fixed Equipment - Noise from fixed equipment such as crushers, ball mills, electric compressors, and pumps often can be reduced by placing the equipment in enclosures or behind barriers. Ball mills often are placed in a building to provide protection from the elements, and the building shell can be designed to provide the required degree of acoustical isolation.

Crushers can be shielded at the sides, but require easy access to the opening. Hoppers handling excavated materials can be lined with damped metal or elastomeric linings to reduce impact noises when materials are dumped or transported. Conveyor systems can be designed to use elastomer-coated rollers or belts to reduce material handling noise levels.

Appendix D offers technical information on noise measurement, along with charts and figures which compare mining-generated noises with more commonly experienced residential noises.

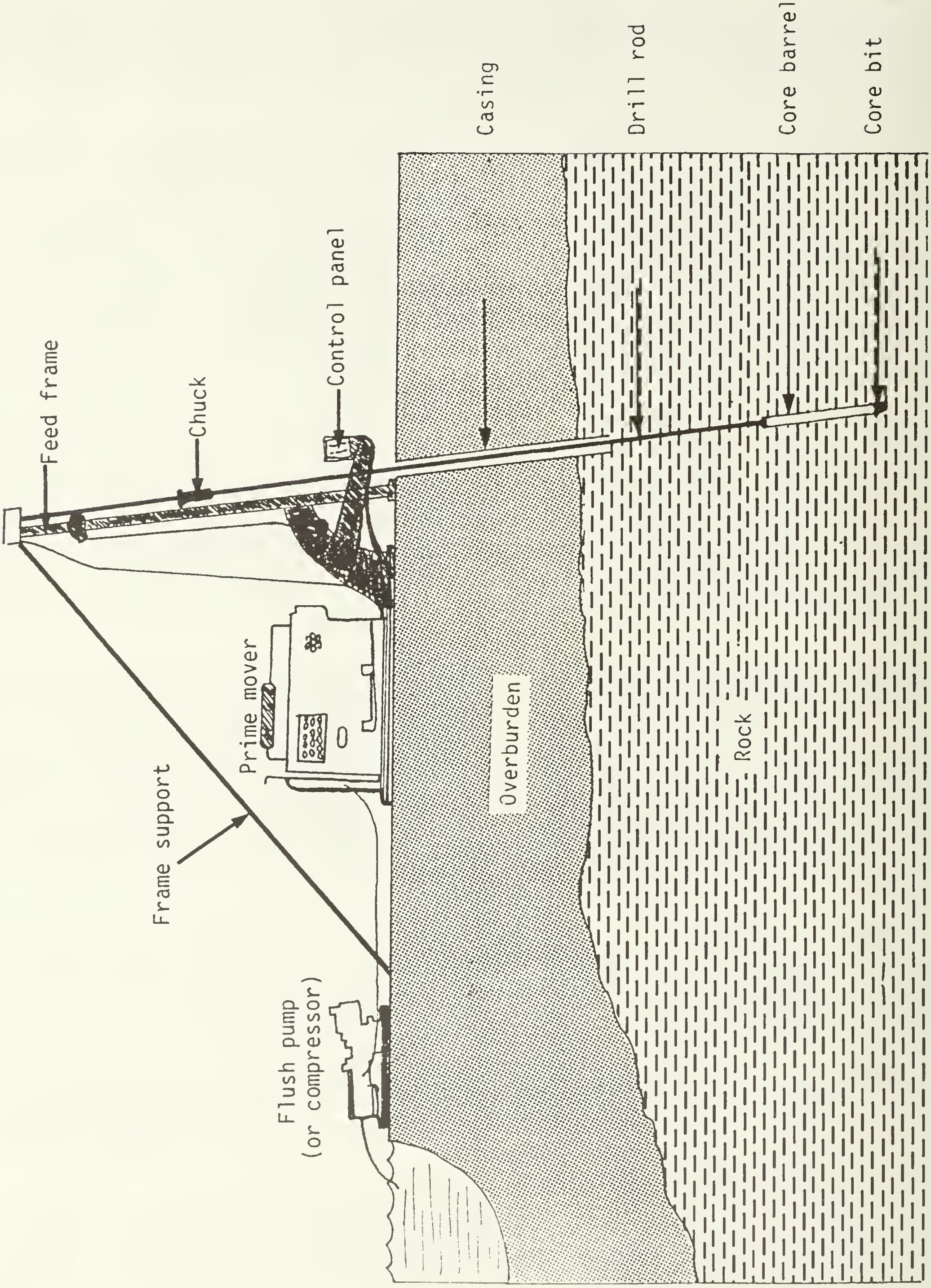


FIGURE 5. Typical Drill Rig

USE OF BARRIERS AND EXHAUST ROUTING
TO REDUCE DRILL RIG NOISE

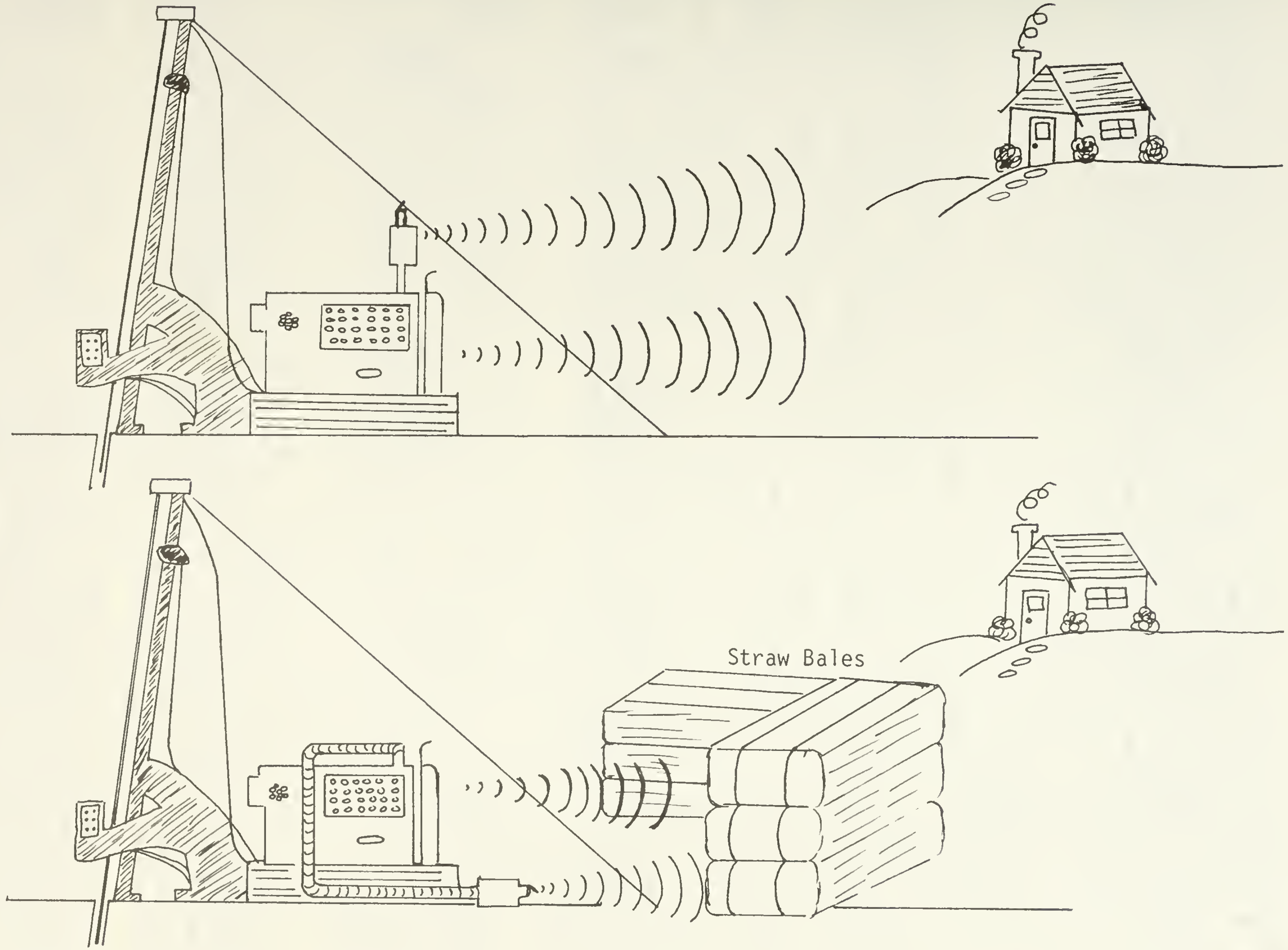


FIGURE 6. Noise Shielding

AIR QUALITY

In most mining operations, only small quantities of non-toxic gases are produced; however, depending on the method of ore extraction and the type of stationary equipment control, emissions of solid particulate matter are potentially significant. The two major classes of mines, surface and underground, share the same basics of ore reduction, but vary significantly in the scale and emission characteristics of ore extraction. Surface mines can generate significant quantities of fugitive dust, while in underground mines this problem is almost nonexistent.

Pollution Sources

During the exploration phase, dust is generated by earth moving equipment and blasting. The development phase produces dust in the same manner as any type of heavy construction project. Sources of pollution during extraction and beneficiation include overburden removal and stockpiling, and ore removal and blasting. This phase also involves the use of potentially hazardous chemicals.

Heavy truck traffic creates dust and exhaust emissions along access roads and at the mine site during all phases of the mining operation. Dust emissions rates are related to treatment or surfacing, if any, of the roadways; silt content and moisture content of the road surface; and vehicle weight and speed. While some of these factors cannot be adjusted, it is possible to maintain a certain amount of control of dust emissions from traffic. Road sprinkling, vehicle weight and speed limits, and location of access roads at optimum distances from off-site residences will significantly reduce traffic-related dust pollution. In addition, the use of in-pit crushing plants and conveyorized transport will reduce truck haul mileage and resultant emissions.

In other than small or exploratory mining operations, a dry ore reduction process is employed. The first stage involves use of gyratory or jaw crushers, which produce limited amounts of dust. If the secondary and tertiary crushing units are enclosed and rely on mechanical feed and removal systems, dust emissions can be kept fairly low. Units which employ air flow for product separation and removal, such as bowl mills with air classifiers, or which crush entirely by impact, can release significant quantities of dust unless adequately controlled.

Once dust has become airborne, local topographical and meteorological factors will determine its area of dispersion. Lofted dust from a surface operation occupying a hill or ridge top normally will be blown further than dust from a site surrounded by hills. An area of high winds will experience dust dispersion over a wider area than a climatically calm area. In the Sierra foothills, the direction of dispersion is normally dictated by topographically controlled air drainage flows (upslope in the daytime, downslope at night).

In addition to solid particulate matter, mining operations also produce emissions of combustion gases and hazardous substances. Mobile equipment exhaust systems, stationary electrical generators, and processing equipment containing fuel combustion sources all emit quantities of gaseous pollutants. In one large proposed placer operation, emissions of oxides of nitrogen from numerous earthmovers were estimated as approaching local air quality deterioration levels.

Cyanide leach solutions are used in the recovery of microscopic gold. Most people are aware of the toxicity of cyanide, but few are familiar with its other characteristics or with the widespread industrial use of cyanides. Leaching with cyanide solutions has been carried out for many years with a very low incidence of accidents. This may be attributed in part to the relatively simple nature of leaching operations, in part to the dependence of the economic success of leaching operations on controlling the gold-carrying solution, and in a large part on the caution with which it is handled.

Free cyanide is rapidly destroyed under normal atmospheric conditions, does not accumulate in organisms, and can be metabolized in small quantities with no residual effects in humans. If the cyanide is properly controlled during transportation and use, the mining operation that uses the heap leaching method can have fewer adverse environmental impacts than one employing conventional methods for gold recovery.

Mercury retorts, used in evaporating mercury from gold solutions in the final steps of processing, can emit large quantities of toxic pollutant if not properly operated and controlled. Finally, if the ore body contains significant concentrations of arsenic, asbestos or other toxic minerals, traces of these materials will be contained in the dust emitted by evacuation, transport, and processing equipment.

Air Quality Control Techniques

As excavation of a surface mine begins, roads are graded and topsoil from the pit area is scraped and stockpiled. The application of water mixed with surfactants during this stage of constant earth movement is an effective method of reducing dust emissions. On road surfaces, application should be made by water truck to provide even distribution, but sprinkler systems may be more efficient for areas under excavation.

Once roads and stockpiles have reached final grade or volume, the surfaces should be stabilized through the application of crust-building dust palliatives. These additives must be reapplied periodically to road surfaces, depending on traffic weight and frequency, and to piles if additional deposits of soil cover the crust. Additional reduction in road dust can be obtained by applying a thick (6") gravel surface or a paved (3" plus base) surface, but the incremental cost/benefit ratio for these control measures is significantly higher than occurs with water applications.

The advance application of a water/surfactant mixture to pit surfaces prior to bulldozer ripping provides some reduction in dust emissions. Such applications to fractured material before being picked up by front end or bucket loader helps contain dust from truck loading. These applications are best made by use of a sprinkler system.

Many well-developed systems exist for the control of dust emissions from stationary processing equipment, ranging from low efficiency water sprays to well-designed baghouses. Spray equipment reduces emissions from material being processed, while collection systems control emissions that have become airborne.

In most mineral processing operations, the addition of water, even in small quantities, does not cause problems with product quality control. Where this is not the case, however, or where high efficiency dust control is required, collection systems should be considered.

A properly designed collection system will duct emissions from all points of dust generation in the dry process circuit to one or more control devices. Only the dump pocket/feed hopper of the primary crusher, or the preliminary scalping screen, where the haul trucks dump their loads, should be excluded from the design. At every other point, there should be installed enclosed hoods with air flows that meet the standards of the American Conference of Governmental Industrial Hygienists.

The selection of a proper control device depends on the characteristics and the economic value of the dust being collected, and on the control efficiency required. If the dust is of value, or if maximum control is desired, the use of a fabric filter baghouse should be considered. If the dust is a waste product, and if water availability and disposal are not problems, then a wet scrubber may suffice. Whatever the choice, the project operator should employ competent engineering assistance in the design of the system.

Additional reduction of dust generated by dry processing equipment can be obtained by enclosing all or a portion of the crushing circuits. Such enclosures have been designed with and without air change systems that vent exhaust air through fabric filter control equipment. The enclosure technique is advantageous if suspended dust in the enclosing building will not increase equipment maintenance costs or create hazardous working conditions for personnel.

In precious mineral mining, further refining of the ore is accomplished through wet operations that are insignificant generators of dust. For such operations, only the control of fugitive dust from tailings piles constitutes an emission concern in the disposal phase of production. This dust can be controlled in the same manner as the dust from other fractured materials.

For other types of mineral production found in the Sierra foothills, the use of dryers and kilns follows crushing operations. High efficiency control systems are invariably required for these processes because of the significant quantities of dust entrained in process gas flows.

Emissions of gaseous pollutants from internal and external combustion equipment usually employed at mining sites are not sufficiently great that stack controls are required. Maintenance of the equipment to assure efficient combustion conditions usually constitutes an adequate level of emission control.

The level of control necessary to protect the public from hazardous air pollutants found in unique mining operations depends on the equipment in use and the concentration of the hazardous material in the process. Controls for these systems must be designed on a case-by-case basis.

HAZARDOUS MATERIALS MANAGEMENT

Hazardous materials are commonly used in the mining industry. Proper management of these materials is very important to ensure public safety and avoid environmental deterioration. There must be guidelines for explosives control, emergency services, and materials disclosure, as well as controls for chemicals that may be used in the mining process.

State and Federal permits are required for the handling of explosives, while other regulations control the use and transport of these materials. At the local level, explosives are under the control of the Sheriff's office.

Materials disclosure and emergency services should be assessed through the use of the environmental procedure required with any discretionary permit. Preliminary investigations into the project should identify processes that are utilized in the operation and what chemicals, if any, are used. Local fire departments and other emergency services should be evaluated to assess their capability in dealing with possible chemical spills or explosions.

Appendix E is a copy of an ordinance prepared by the Nevada County Health Department, covering the storage and use of hazardous materials. The ordinance is considered an excellent model for the development of similar documents by other counties.

Heap leaching, a chemical process used in mining operations, utilizes cyanide. The September, 1983 issue of California Geology, published by the California Division of Mines and Geology, contains an excellent article on heap leaching, including methods, and health and safety aspects of the process. Additional information is available from Du Pont Corporation. These publications provide an overview of the properties, uses, storage, and handling of sodium cyanide. They contain typical layouts for heap leach ponds, as well as the utilization and the abandonment of such ponds. Health and safety references are also provided in these publications.

TRANSPORTATION/TRAFFIC

Traffic studies involve an assessment of the road system serving the mine area both on a local and a regional level. The studies include identification of federal, state, county, city, and private roads that have a potential for use in connection with the mining project.

Evaluation of transportation and traffic impacts is performed through the use of current traffic engineering data in the form of average daily trips (ADT). This information is available from records in the County Public Works Departments, City Engineering Departments, and the California Department of Transportation. The information may be supplemented by actual traffic counts conducted by the traffic engineer preparing the report.

Using the report data, an evaluation can be made of the current ADT and the projected ADT expected to occur as a result of growth in the mining area. Further evaluation will attempt to distinguish and characterize the nature and quantity of traffic to be generated from the project. The evaluation should assess trips generated by employees, trucks delivering equipment and supplies, and truck traffic associated with transportation of bulk products harvested and processed on-site. The analysis will also include an assessment of existing major traffic generators in the area, and any other special traffic types such as school buses and emergency vehicles.

When the basic information has been collected, the report will assess traffic impacts from the project, including increased road usage through turning movements, traffic numbers, and traffic peaks. Potential traffic conflicts resulting from nature and quantity of traffic will be identified. The traffic engineer, using the accumulated data, will prepare a traffic report suggesting mitigation measures, which may include improvements to the roads in the area of the mine site in order to accommodate the increase in traffic.

The preparation and review of a traffic study, and the decisions made regarding traffic impacts are based on the following perspectives:

1. A property owner is entitled to use his/her property, and to utilize the public roads in the area in a manner consistent with local and state regulations.

2. Improvements, including safety features, required on the traveled roads to accommodate the increase in quantity and quality of traffic are the responsibility of the project proponent.

3. It must be demonstrated that permission has been granted, by the owner's legal right, for the increase of use (burden) on a private road. Improvements required to these private roads are ultimately the responsibility of the project proponent.

4. Alleged road impacts that are not substantiated by real traffic engineering impacts are not sufficient to require road improvements under most road improvement ordinances.

5. It is not uncommon to have road development fees charged to the project proponent in order to offset the project's cumulative impacts on the local road system.

6. Major road impacts resulting from mining projects come from extensive aggregate transporting. This type of traffic creates the greatest degree of impact.

Increased use of roads in mining areas is a cause of concern to nearby residents, county public works and engineering departments, and the California Department of Transportation. The accuracy of statistics and analysis of the traffic engineering report is essential in providing adequate road improvements and other mitigation measures.

The following paragraphs outline an environmentally sound approach to construction of the road network serving a mining site.

Wherever possible, roads should be located on benches, ridge tops, and lesser slopes, to minimize disturbance and enhance stability. No road should be constructed along a live stream channel or so close to the stream that material will spill into the channel. Minor alterations and relocations of streams may be permitted if the stream will not be blocked and if no damage is done to the stream or to adjoining landowners. An alteration which affects the channel of a flowing stream should be subject to review and permit by local wildlife agencies; state engineering or water resource department personnel; Army Corps of Engineers personnel; and the responsible local, state, and federal mining regulatory agencies.

Except for short pitches, road gradients should be kept low to take advantage of topography; however, roadcut side slopes should be steep enough to minimize surface disturbances. Cut slopes should not be steeper than 1:1 in soil, sand, gravel, or colluvium; $\frac{1}{4}$:1 in lake silts; or more than 0:1 in rock. Where necessary to prevent significant sloughing or slumping, the top of roadcuts must be rounded back to a more gentle slope. In selecting a slope angle to prevent slope failure, the operator should consider the nature of the material, compaction, slope height, and moisture conditions of a particular site.

A ditch should be provided on both sides of a throughcut and, with the exception of outsloping roads, on the inside shoulder of a cut-fill section. Ditch relief cross drains should be spaced according to grade. Water must be intercepted before reaching a switchback or large fill, and must be led off. Water on a fill or switchback must be released below the fill or switchback rather than over it. Streams should be crossed at or near right angles unless contouring down to the streambed will result in less potential streambank erosion. Structure or ford entrances and exits must be constructed to prevent water from flowing down the roadway. Culverts must be installed at prominent drainageways, small creeks, and springs. Culverts must be sufficient to handle runoff expected from statistical storms. Culverts should be protected from erosion by adequate rock rip-rap or other suitable rip-rap substitutes. Drainage facilities must be installed as road construction progresses.

Trees and vegetation must be cleared for only the essential width necessary to maintain soil stability and to serve traffic needs. When sideslopes are 15 percent or less, vegetative debris from clearing operations should be completely disposed of or stockpiled at specific areas. On sideslopes steeper than 15 percent, such vegetative debris should be piled neatly parallel to and below the top of the fill.

Adequate diagonal drainage barriers and the open tops of Kelly dips must be placed at the following intervals:

Percent of Grade	Maximum Spacing in Feet
0 - 2	200
3 - 8	150
9 -12	80

Roads must be outsloped whenever possible unless roads are to be used during winter; then insloping with proper drainage consideration is acceptable for vehicle safety reasons. Any grading which is employed must be done in such a manner that runoff water will not be trapped between the berms and run down the road. Materials which slough or slump onto the roadbed or into the roadside drainage ditch before the operator abandons the area must be disposed of in the roadbed or on the sidehill in a manner that will not obstruct any of the drainage facilities.

Following are some pertinent considerations of road reclamation:

- If roads are left after exploration, company maintenance must end when bonds are released.
- Sign-off by county road engineers or other authorities may be required on in-place roads to assure against prolonged engineering and construction liabilities for roads left after exploration.
- Roads which undergo reclamation may need to be ripped in order to provide cohesion for replaced topsoil and to allow a more favorable plant rooting zone to exist.
- Since root decay makes topsoil a poor fill material for roads, the topsoil may have been segregated during road construction, and may be available for reclamation.
- Berms should be shaped into the contour.
- Culverts in some cases may need to be breached and buried.
- Drainage should be established so that erosion and runoff can be controlled.

In general, the operator should be allowed to leave newly constructed roads in place following exploration. Often it is less costly to build a permanent road than it is to construct and reclaim a temporary road. Upgrading existing roads is typically not considered new disturbance, and is not subject to reclamation.

WILDLIFE

The overall purpose of a wildlife assessment is to inform decisionmakers and the public of the possible environmental consequences of a mining and reclamation project. When wildlife will be affected significantly, measures should be included to provide concurrent reclamation, direct avoidance of critical areas, and habitat restoration through the reclamation plan.

The mining project itself and the reclamation plan both pose a potential threat to wildlife resources. Mining activities which directly affect wildlife include noise, light, glare, fencing, soil erosion, siltation of stream zones and waterways, and stripping of vegetation.

A comprehensive wildlife assessment involves an analysis of birds and animals in the area, along with their habitats, and food sources provided by plant life and water bodies. Areas with water are more significant as wildlife habitats, since riparian areas provide more food and shelter than other areas. There are two techniques used to evaluate the nature of wildlife habitat areas. The process selected will depend on the size of the project and the sensitivity of the site. One evaluation consists of a description of the types of animal life commonly associated with the life zone (geographical area and plant community native to that area). This type of evaluation includes a representative list of birds and animals commonly associated with the specific life zone. The second type of evaluation includes an on-site field review, in which a wildlife biologist visits the area and studies the habitat. The biologist makes a determination based on actual sightings of plant and animal life in the environment, along with a list of those which were not sighted but would probably occur within the life zone.

In the Sierra Nevada foothills there are two primary wildlife concerns: impacts on deer herds, and impacts on rare and endangered species. Mining activities may result in the destruction of critical deer winter ranges, fawning areas, and deer migratory routes. Permanent disturbance of such areas may result in reductions of the deer herds. Any project impacts that are considered major and irreversible in these areas are recognized as significant environmental impacts.

The Southern Bald Eagle, the American Peregrine Falcon, and the Wolverine are examples of rare and endangered species existing in the Sierra Nevada Mountains and the foothill regions. These animals and their habitats must be adequately examined and assessed to preclude detrimental impacts from mining ventures.

VEGETATION

Impacts on vegetation as a result of mining activities might include erodibility and soil toxicity, or disturbing a critical plant species stand.

A pre-operational survey should be made of the site to identify existing vegetation by species composition, productivity and cover density of the site, and its prior use. Native versus introduced species, threatened and/or endangered plant species, animals supported by the existing vegetation, yearly and seasonal variability, and potential pest problems should also be noted.

If the reclamation program dictates returning the site to a natural condition, the following procedures should be followed:

Seeding and Planting

Replacement of stockpiled topsoil will provide an initial source of the vegetation found on the site prior to prospecting. A site-specific seed mix may be used, but only after consideration of the intended future use of the site. However, some regulations limit the types of plants which can be established, thereby limiting approved post-operation land uses.

Reclamation seedings, according to recent studies, can require more than twenty pounds pure live seed per acre drilled and forty pounds per acre broadcast. Unless a drill pad is prepared by bulldozing, much of the drilling activities normally associated with exploration and mining could be reclaimed using interseeding techniques.

If the mining site covers a relatively small acreage, hand broadcast seeding and hand raking are easily accomplished. For most areas, fall seeding is recommended because soil moisture conditions are more favorable than during the spring. However, if a small acreage is involved, it is safe to seed at any time.

If planting is to be done to supplement seeding, or in lieu of seeding, careful consideration must be given to the time of planting. Although some areas are suitable for fall planting, due to favorable soil moisture, spring frost in high altitudes may make late spring/early summer planting necessary. Whenever possible, seeding is preferable to planting.

Fertilizing

Many western soils are poor in nitrogen and phosphorous, necessitating the addition of fertilizers to the soil during reclamation. Fertilizers may be worked into the soil prior to seeding, or applied in the growing season following seeding. Since most fertilizer soil amendments contain salts, germination may be inhibited if fertilizer is applied during the seeding process. Application of post-emergence fertilizers may require field travel long after the completion of the mining operation, while tilled-in fertilizers require the use of possibly expensive powered equipment. While fertilizers will reduce the time required for establishment of vegetation, they will not appreciably increase the potential for establishment.

When the reclamation process is successful, the vegetation will provide ground cover, reduce or prevent erosion, and eventually will return the site to a useable condition.

SOILS AND GEOLOGY

The soil properties in an area to be mined will influence general construction, pollution concerns, reclamation, and future land use. Pre-mining plans must include a complete analysis of the soils in the affected area in order to identify potential problems and plan suitable mitigation measures. In addition, the Environmental Impact Report should include identified problems or limitations and specify corrective measures.

Soil properties will dictate construction requirements for stable roads and building pads, as well as the ability to construct cuts and fills. Soil properties are of primary importance in constructing water impoundment structures. Embankments, dikes, and levees require soil that is resistant to seepage, erosion, and piping; and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics.

In addition to air and water pollution, which are covered under separate headings in this section, the greatest potential geological impact of mine development and operation is the creation of landslides. Removing cover vegetation, steepening slopes, and building roads all can result in landslide activity in hilly or mountainous areas. In addition to the danger they pose to people living and working in the area, landslides also cause damage to watersheds, streams, and rivers.

A thorough field study of the project site and a review of the proposed operation is required to preclude permanent environmental damage to the site and danger to the persons involved. During the initial and intermediate stages of exploration, when seismic activity, core drilling, and road building may occur, the soil can be analyzed based on existing soils survey data, or data can be extrapolated from areas with similar environments.

Soils and overburden analyses should be conducted to identify the qualities of the topsoil, or upper root zone, which consists of approximately six inches of material that is conducive to plant growth. Overburden includes materials overlying a minable deposit, up to but not including the topsoil.

Where it is necessary to construct a drilling pad or building by bulldozing or grading, the topsoil should be segregated from other surface materials, and located where it will be protected from erosion.

Soil analysis will also identify zones in the soils or overburden that may adversely affect revegetation efforts when this material is replaced on the site. Based on these studies, it may be determined that the site is unstable, or is so productive that it should not be disturbed. Both situations would preclude mining operations.

TIMBERLAND PRODUCTIVITY ZONES AND AGRICULTURAL PRESERVES

To combat an alarming loss of timber production capability due to development speculation, encroachment of incompatible land uses, and high taxes on timberland due to development potential, the California State Legislature enacted the Forest Taxation Act of 1976 to implement the following policies:

a) The Legislature declares that, in order to fully realize the productive potential of the forest resources and timberlands of the State, and to provide a favorable climate for long-term investment in forest resources, it is the policy of this State to do all of the following:

   1) Maintain the optimum amount of the limited supply of timberland so as to ensure its current and continued availability for the growing and harvesting of timber and compatible uses.

   2) Discourage premature or unnecessary conversion of timberland to urban and other uses.

   3) Discourage expansion of urban services into timberland.

b) The Legislature further declares that it is the policy of this State that timber operations conducted in a manner consistent with forest practice rules adopted by the State Board of Forestry shall not be or become restricted or prohibited due to any land use in or around the locality of those operations.

The act was amended in 1982, primarily to change the nomenclature from Timberland Preserve Zones to Timberland Productivity Zones. As a result of the act, counties and cities were required to establish timberland production zoning and to follow a specified process for identifying and zoning suitable timberlands as Timberland Productivity Zones (TZPs). The County Assessors were directed to establish two lists. List "A" consists of all parcels, regardless of size, which, as of the 1976 lien date, were assessed for the growing and harvesting of timber as the highest and best use of the land. List "B" contains all parcels which, as of the 1976 lien date, appeared in the judgement of the assessor to constitute timberland, but which were not assessed for the growing and harvesting of timber as the highest and best use. These lists are available for review at the offices of the County Assessors.

For the purpose of the Act, "timberland" is defined as privately owned land, or land acquired for State forest purposes, which is devoted to and used for growing and harvesting timber and compatible uses, and which is capable of growing an average annual volume of wood fiber of at least 15 cubic feet per acre.

Owners were given a chance to contest the inclusion of their land on either of the lists. The parcels were zoned TPZ unless the owner proved to the satisfaction of a majority of the full County Board of Supervisors or City Council that the land is not capable of growing 15 cubic feet of wood fiber per acre, that the use had changed and the current use was not compatible with the growing and harvesting of timber, or that it would not be in the public interest to zone the land TPZ. The zoning of parcels on Lists A and B was completed by March 1, 1978.

Following the initial phase of zoning, property could be zoned TPZ as a result of application by the owner, and upon findings that the land met the minimum qualifications for the zone.

Some mineralized areas and lands with sparse timber were included in the TPZ because of the zoning criteria and process, and the lack of mining interest and activity during the mid-1970s. If portions of a property were rocky, or otherwise not suitable timberland, but if the parcel as a whole met the minimum requirements for List A or B, the Assessor listed the entire parcel. In this manner, inactive mines and hydraulic works were included in Timber Productivity Zones. Unless the owner contested the zoning based on a potential higher use or an existing incompatible use, such as mining, zoning was accomplished and the property regulated for timberland and compatible uses. Many landowners did not consider mining to be a viable industry at this time, and did not contest the zoning.

Timberland Production Zoning was established for an initial period of ten years. On the first and each subsequent anniversary date of the initial zoning, a year is added to the initial term, unless a notice of rezoning is given in accordance with existing laws.

In return for the zoning and use restrictions placed on property by TPZ actions, taxation is based on such restrictions. Property valuation rates for TPZ are set each year by the State Board of Forestry. This tax structure results in substantial tax savings. For example, Site Class II timberland in a TPZ is taxed at a rate of $0.67 per acre per year in 1985. If not in a TPZ, the property could be taxed at a minimum rate of $5.00 per acre per year. Some compatible uses and improvements are taxed as if the TPZ did not exist. Details of specific cases are available from the local County Assessor.

The Act defines "compatible uses" in the TPZ as follows:

> "Compatible use" is any use which does not significantly detract from the use of the property for, or inhibit, growing and harvesting timber, and shall include, but not be limited to, any of the following, unless in a specific instance such a use would be contrary to the preceding definition of compatible use:
>
> 1) Management for watershed.
>
> 2) Management for fish and wildlife habitat or hunting or fishing.
>
> 3) A use integrally related to the growing, harvesting, and processing of forest products, including but not limited to roads, log landings, and lot storage areas.
>
> 4) The erection, construction, alteration, or maintenance of gas, electric, water, or communication transmission facilities.
>
> 5) Grazing
>
> 6) A residence or other structure necessary for the management of land zoned for timberland production.

The Boards and Councils of counties and cities were required to adopt a list of additional compatible uses for parcels zoned for Timberland Production. Most counties and cities did not add any compatible uses, but mining within specified constraints was added by a few local governments. Uses not listed as compatible, or uses which are listed as compatible but which in a specific instance would be contrary to the definition of "compatible use", are prohibited in a TPZ.

In some jurisdictions, surface use is limited to less than three acres per parcel for mining purposes. It is difficult to comply with this regulation, even with an underground mine, since surface support facilities and tailings consume large areas. Under this restriction, it is difficult to design a surface mine within the definition of a compatible use, unless it is sited in an area of sparse timber.

Timberland production zoning is an enforceable restriction. A city or county with jurisdiction may bring any action in court necessary to prohibit a use not permitted in a TPZ, including, but not limited to, an action to enforce the zoning restrictions by specific performance or injunction. Local governments are required to enforce and administer the restrictions so as to accomplish the purposes of the Act.

Before making a major financial commitment, a mine developer should consult the Planning Department of the relevant jurisdiction to determine what regulations regarding TPZ are in effect, and how they are implemented. If the development cannot be designed to be compatible with existing zoning, an attempt may be made to have the area rezoned. A rezoning can take either ten years to become effective or can be effected immediately. Both processes require the approval of the appropriate Board of Supervisors or City Council; however, an immediate rezoning must 1) be requested by the landowner, and 2) be approved by four-fifths of the full Board or Council.

If an application for timberland conversion is required pursuant to Section 4621 of the California Public Resources Code, the immediate rezoning approval is not effective until the State Board of Forestry has approved the conversion. Strict findings must be made for the approval of an immediate rezoning or a conversion of Timber Productivity Zones. The Board or Council specifies a subsequent zoning for rezoned TPZ lands. In the case of regular TPZ rezonings, the property taxes increase over the ten year interim period. A tax recoupment fee is charged for immediate rezonings.

Few immediate rezonings have been approved by the State Board of Forestry. As a result, county rezonings are infrequent.

California has established State laws providing tax incentives for many landowners who enter into a contract with counties to establish agricultural and/or timberland preserves. These large land holdings are made possible because of the tax incentives, and in turn, provide future resources for California's residents.

Mineral extraction activities within these contracted lands is subject to criticism as being incompatible with the intent of the contracts. A primary objection is that mining is not compatible with agricultural land usage. The California Land Conservation Act of 1956, Government Code Section 51201, Subsection (e), defines land uses that are compatible with contract land uses. The final determination of compatibility lies with the county or city administering the land contracts.

The applicant, the public, and the city/county should understand clearly the process for determining compatible uses of contracted lands. In addition, the applicant should ensure that the county or city has made the necessary statements or adopted appropriate resolutions regarding compatible land uses and contract lands.

Another criticism of mining contract lands is that the landowners profit twice; once from the tax benefits and again, concurrently, from mineral leases. The double benefit situation is not considered an environmental or a land use issue. It is a taxing issue and is controlled and administered by the State of California. Local jurisdictions cannot alter tax incentives established by the State.

ARCHAEOLOGY AND HISTORIC PRESERVATION

Mineral exploration or extraction may destroy, impair access to, or encourage access to architecturally important buildings and archaeological sites. A careful assessment of mining impacts in these areas should be made by a qualified person or organization.

Initial investigation of this subject usually begins with a "paper search", or preliminary report. Such a report can be provided at a nominal fee by the California State University at Sacramento, or by the State Department of Parks and Recreation, Office of Historic Preservation. The report will identify available information and, if appropriate, will recommend further on-site investigation.

An on-site investigation, if required, will be made by the person or organization responsible for evaluating and assessing the mining project in relation to the historic value of the site. Recommendations may include:

1) Preservation of the site or sites,

2) Investigation and exploration of the site, and/or

3) Methods to relocate the site.

These recommendations normally are adopted as mitigation measures, and are incorporated as part of the implementation plan if the project is approved.

Additional sources of information on this subject include the National Register for sites, buildings, and objects of national significance to the history of American architectural, archaeological, and cultural resources; The California Register; the historical section of local libraries; and local historical societies.

VISUAL RESOURCES

The Sierra foothills region abounds in unique landscapes, rushing rivers, and distinctive lake scenery. The continued influx of people from urban areas to the Mother Lode is due, in part, to an increasing awareness of the natural beauty of this region.

Research has demonstrated that the public expects to see, and retain, natural appearing landscapes. For this reason, the "visual landscape" has been established as a fundamental resource and an essential part of the resource base. Landscape issues must receive the same consideration accorded to other resource issues such as water quality and air quality.

In an effort to incorporate visual resources with the management of other resources, the United States Forest Service, in 1973, developed a system to inventory and classify National Forest lands. Known as the Visual Management System (VMS), it assesses 1) the significance of visual resources, 2) the capability of National Forest lands to withstand various types and intensities of use, and 3) the existing condition of the visual resources of the Forest.

VMS can be easily adapted for use in the visual or esthetic analysis of mining projects on private lands. Appendix F is a more detailed description of the Visual Management System. The complete system is presented in Agriculture Handbook Number 462, April, 1974, published by the United States Department of Agriculture, and available from the Government Printing Office in Washington, D.C.

SECTION VIII: RECLAMATION AND SECOND USES OF MINED LAND

The State of California's Surface Mining and Reclamation Act (SMARA) requires that a Reclamation Plan be prepared by applicants and approved by lead agencies before mining operations are initiated. The purpose of the Reclamation Plan is to ensure that mined lands are reclaimed to a usable condition that is readily adaptable for alternative land uses, and that adverse environmental effects are prevented or minimized. A major goal in requiring such a plan is to optimize subsequent land use at a reasonable cost, and to avoid the legal and environmental problems created by abandoned mines.

Before beginning development or excavation, the mine operator should document carefully all indications of previous site disturbance for which he is unwilling to accept reclamation responsibility. In cases of excessive previous disturbance, the operator should tour the project area with appropriate regulators before creating any further disturbance in the area.

Primarily, reclamation is intended to restore mined land to a useable condition, a process that involves two basic steps: 1) environmental restoration of the land to a condition whereby it can be adapted to a second use, and 2) establishment of a second use. Various factors influence the determination of a suitable second use for mined lands. Following is a brief discussion of some of these factors.

1. General Plan/Zoning Standards

The General Plan and zoning standards provides general guidance regarding the range of appropriate land uses. Second use may be resource oriented, such as agriculture, timber, watershed or wildlife management; or it may consist of permanent or semi-permanent real estate use such as residential, industrial, institutional, or recreational development. Planners, mine operators, land owners, and community members should be aware of the use range when making decisions about the future of the proposed mine site.

2. Locale

Geographic location, surrounding environment, adjacent land uses, and available public services (infrastructure) all are important in determining appropriate second use.

Geographic location is the setting of the site in one of four basic geographical areas: Desert, mountains, valley, or coast. This feature will greatly influence second use planning, as well as the restoration efforts involved.

Surrounding environment is one of two general types of environmental settings: Natural or man-made. A man-made environment may allow much greater latitude in planning the second use of the land, as well as more flexibility in the restoration process.

Adjacent land use is important in planning second land use and restoration. Second use must be compatible with the present use of the surrounding land, and should provide sufficient incentive that the interim mining operation will be acceptable to the community.

Public services must be carefully assessed in determining appropriate second use of mined land. A site that lacks sewer and water lines, or is not easily accessible via public roads, for instance, would not be suitable as a public park or building development site.

3. Community Preference

Reclamation of mined land provides an excellent opportunity to fulfill recognized community needs, an appeal that may help ameliorate the effects of mining proposals on the community and nearby residents. Second land use planning that is designed to meet specific community needs usually provides land for passive and/or active recreation. Such planning should be closely coordinated with a public agency at the district, city, county, or state level. The local or state jurisdiction must be in a position to direct reclamation efforts to meet the specified needs, and also to receive or purchase the land when reclamation is completed.

Community wishes can also be implemented by the private sector. In such cases, reclamation usually would address a social/economic need that translates into stable employment opportunities.

4. Property Owners' Wishes

Property owners are justified in requiring second land use and reclamation programs that meet their wishes; however, if the owner is also the mine owner, or if the owner is an absentee landowner, these requirements may be inadequate to satisfy the remainder of the community. One important consideration in this case is that proper and responsible reclamation efforts can substantially increase the value of the mined property and its surroundings.

5. Type of Mine

Reclamation must be responsive to the type of mine and the mineral recovery methods employed. The three basic types of mines are open-pit, underground, and in-stream. The first two involve mining a finite resource to its economic limits. The latter may include repetitive extraction, because of the dynamic forces that continue to transfer more and more mineable material to the mining area.

One major reclamation problem involves the amount of mineable material removed from the site. In an aggregate resource extraction operation such as limestone, sand, or gravel, a large volume of material leaves the site. The opportunity for returning the site to near-natural conditions is seriously hampered, unless appropriate fill material is acquired. Operations requiring minimal removal of material offer more favorable opportunities for restoring the land to pre-mining conditions. These operations permit stripping and storage of top and sub-soil and overburden until backfill operations are begun.

Whenever possible, land restoration should be accomplished concurrently with mining operations. This is especially true in high rainfall areas such as the Sierra Nevadas and the foothills areas. Concurrent restoration prevents soil loss through erosion, and precludes pollution of water courses, while minimizing mine-related land scars.

CONCLUSION

Perhaps the most significant findings of our research involve the urgent need for comprehensive mineral management planning by local jurisdictions. Such planning should begin with identification of important mineral reserve areas, including identification of such areas where mineral harvesting is currently unsuitable. Mineral conservation can be accomplished through planning efforts designed to foster sound harvesting programs as well as protection of mineral resources for future use.

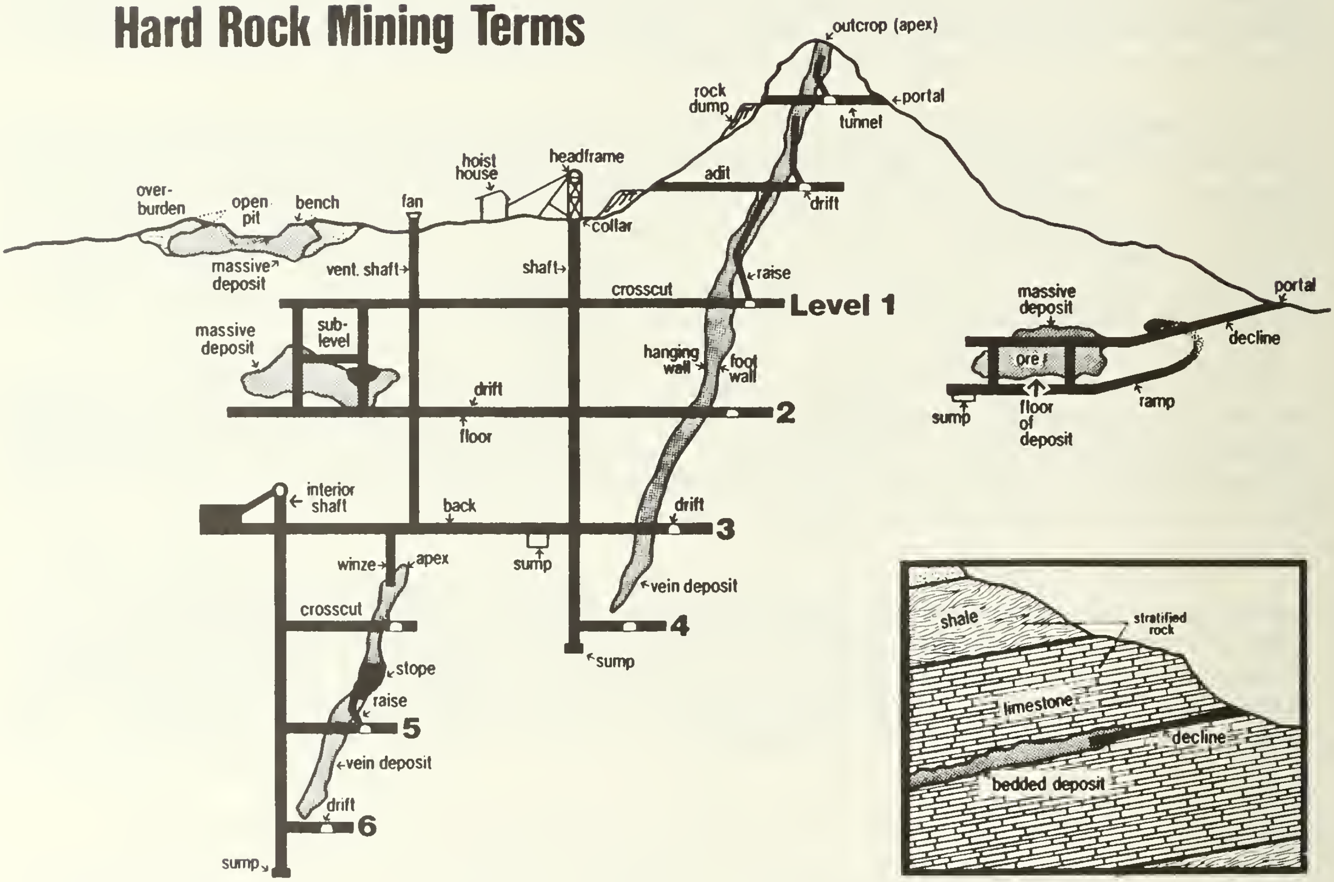
Another major concern is the importance of continuing public participation in the community land use and planning process. County and city planning personnel, as well as elected officials, can respond to the needs and wishes of local residents only if they are kept informed and aware of public opinions. Only in this way can local policies be truly representative of the community, and serve what the community perceives as its best interests.

An important factor is the attitude of public officials and agencies towards citizens and community groups. We heard complaints of changes in dates and locations of meetings that were purported to be open to the public; changes that were not preceded by sufficient notification to enable concerned citizens to attend. Whether these complaints are justified or not, it must be recognized that anything other than complete openness and candor by public officials tends to create suspicion and animosity in the community.

The members of the Foothills Mining Task Force suggest that this handbook be made a standard reference work in areas where proposals or plans for mineral mining operations arise. We feel that it will be a valuable tool for the community, public officials, and mining operators in alleviating the controversy and acrimony that presently surround the mining issue.

Through a careful study of the topics presented here, and further research among the resources listed, it is possible that a common understanding can be reached among the three groups that will enable mining to become once again a viable industry in the foothills, contributing significantly to economic growth and stability without destroying the quality of life so valued by the residents. This is our goal in preparing this publication.

Hard Rock Mining Terms



GLOSSARY

APEX - The top or terminal edge of a mineral vein, either on the surface or at its nearest point to the surface.

ADIT - A horizontal or nearly horizontal underground passage coming to the surface at one end.

BACK - The roof or overhead surface of an underground excavation.

BEDS, BEDDED DEPOSIT - 1) Tabular deposits, lying conformable to the stratification of enclosing rocks; 2) Detrital or sedimentary superficial deposits. (See PLACER DEPOSIT)

BENCH - The surface of an excavated area at some point between the material being mined and the original surface of the ground, on which equipment can move or operate.

BENEFICIATION - The dressing or processing of ores for the purpose of 1) regulating the size of a desired product; 2) removing unwanted constituents; 3) improving the quality, purity, or assay grade of a desired product.

COLLAR - The surface at the beginning point of a shaft or drill hole.

DECLINE - A low dipping inclined shaft, developed downward, giving access to, and serving the various levels of a mine. In modern times, a frequently used method of access for mobile diesel equipment.

DEVELOPMENT - The driving of openings to and in a proved deposit, for mining and handling the product economically.

DEVELOPMENT ROCK - Barren or submarginally mineralized rock obtained from the work required to open up orebodies. It is not of sufficient value to warrant treatment, and is therefore removed ahead of the milling, or beneficiation, process.

DEWATERING - The process of pumping accumulated water from mine pits, shafts, and tunnels.

DRIFT - A horizontal or near-horizontal opening, lying in or near the orebody, parallel or nearly parallel to its strike.

EXPLORATION - The work of exploring a mineral deposit. It is undertaken to gain knowledge of the size, shape, position, characteristics, and value of the deposit.

EXTRACTION - The process of extracting the mineral.

FLOOR - 1) The bottom or lowermost horizontal, or near horizontal, surface of a mine or mineral deposit. 2) The bottom surface of an underground excavation.

FOOTWALL - Ore limit or wall rock on the lower side of a dipping orebody. Known as a FLOOR in bedded deposits.

GANGUE - Undesired minerals, mostly nonmetallic, associated with ore.

HANGING WALL - Ore limit or wall-rock on the upper side of a dipping orebody. Known as a ROOF in bedded deposits.

HEADFRAME - A structure erected over a shaft to support the sheave wheel for hoisting purposes.

LEVEL - The horizon at which an orebody is opened up, and from which mining proceeds. The term is often used in the same sense as "drift," or to cover all horizontal workings on one horizon.

LODE - A veinlike deposit, usually metalliferous. See VEIN.

MASSES - Massive deposit. Large orebodies of irregular shape, standing at any angle, which cannot be recognized as veins or beds.

MINING DEBRIS - Tailings from hydraulic mines. Specifically, the sand, gravel, and cobbles which pass through the sluices in hydraulic (placer) mining.

OPEN PIT - A general term for a mine working or excavation open to the surface.

ORE - A metalliferous mineral, or an aggregate of metalliferous minerals, more or less mixed with gangue, which, from the standpoint of a miner, can be mined at a profit, or, from the standpoint of a metallurgist, can be treated at a profit.

OUTCROP - The exposed surface of a mineral deposit.

OVERBURDEN - The soil or rock that covers a mineral deposit.

PLACER DEPOSIT - A mass of gravel, sand, or similar material resulting from erosion of solid rocks, and containing particles of gold, platinum, tin, or other valuable minerals.

PORTAL - The surface entrance to a drift, tunnel, adit, or decline.

PROSPECT - A mineral property before exploration has proved it to be worthy of development.

PROSPECTING - The search for minerals.

QUARRYING - A method of mining in which large blocks of rock are wedged loose or sawed out of a deposit that lies near the surface. Chains and pulleys are used to lift the blocks from the pit. Miners quarry such rock materials as marble, granite, sandstone, limestone, and slate.

RAISE - A shaft or winze excavated upward, as for connecting adjacent levels. Terms WINZE and RAISE are used interchangeably to describe a completed opening.

RAMP - An inclined underground opening, usually driven downwards, connecting levels or production areas, with inclination allowing passage of motorized vehicles.

ROCK DUMP - An area where development rock is stored.

SHAFT - A vertical or steeply inclined opening, giving access to and serving the various levels of a mine. An inside or interior shaft is one which does not open to the surface.

STOPE - An underground excavation resulting from actual mining of ore, as distinguished from other excavations in ore such as drifts, crosscuts, raises, or winzes. The verb "to stope" is used loosely, but usually denotes the general plan and work of breaking ground in stopes.

STRATIFIED - The property of being in beds or layers.

STRIP MINE - Also known as an open-pit or surface mine. Strip mining is employed when the ore lies close to the surface.

STRIKE - The main horizontal course or direction of a mineral deposit.

SUBLEVEL - A system of horizontal underground workings, normally within stoping areas only, required for ore production.

SUMP - An excavation made at the bottom of a shaft, or on a selected level, to collect water in order to remove it from the mine.

TAILINGS - The gangue and other refuse material resulting from the washing, concentration, or treatment of ground ore.

TAILING DISPOSAL AREA - An area where mill tailings are stored.

TUNNEL - A horizontal or nearly horizontal underground passage, coming to the surface at both ends.

VEIN - A tabular shaped deposit of non-sedimentary origin, usually dipping at high angles. See LODE.

WINZE - An opening like a small shaft, sunk from an interior point in the mine.

APPENDIX A

GEOPHYSICAL EXPLORATION

A geophysical survey is an integral part of a mineral exploration campaign. It may be carried out from the air, on the ground, underwater, in mines, or down drillholes. The primary objectives of the survey are to minimize exploration costs and maximize the success of exploratory drilling.

There are ten basic geophysical survey methods, all employing the principles of physics, magnetism, gravity, electricity, radioactivity, seismology, and heat. It is often necessary to combine two or more methods to acquire sufficient data for accurate interpretation. Survey results, together with geological and drilling data, provide a basis for the decision to continue with exploration or to abandon the project.

MAGNETIC SURVEYS

These surveys record the variations in the earth's magnetic field caused by the magnetic properties of sub-surface bodies. In ore prospecting, these variations are especially useful in locating magnetite, pyrrhotite, and ilmenite. Magnetic logging in drillholes is also employed to obtain data for the direction of further drilling.

ELECTROMAGNETIC SURVEYS

When an electromagnetic conductor is subjected to a primary alternating field, the induced current creates a secondary field which can be detected and measured, thus indicating the presence of the conductor. Electromagnetic surveys based on this phenomenon are used to locate mineral deposits as well as to map the geologic structure of an area. Among the minerals that can be located by this method are the sulphide ores of copper and lead, magnetite, pyrites, some manganese ores, and graphite.

ELECTRICAL SURVEYS

These employ either the natural flow of electricity in the ground or "galvanic" currents led into the ground and accurately controlled. They are used to locate shallow mineral deposits and map geologic structure, and to determine the depth to bedrock or water table. In ore prospecting, these surveys are often used to differentiate the conducting zones located by electromagnetic methods.

GRAVIMETRIC SURVEYS

Gravimetric methods are based on the detection of small changes in the surface gravitational effect caused by the pull of rocks lying as much as several kilometers below the surface. They may be used to locate faults, anticlines, and salt domes that may be associated with oil-bearing formations, or to detect high density ore bodies, such as iron ores, pyrites, and occasionally lead and zinc ores.

RADIOACTIVITY SURVEYS

These surveys locate areas with radiation intensity significantly higher than normal background levels. Radioactivity surveys are used in the search for uranium and thorium, and indirectly to locate minerals which are associated with radioactive substances.

SEISMIC SURVEYS

The basis of the seismic method is the wide variation in the velocity of sound waves in different geologic strata. The source of the sound may be a sledge hammer, a heavy falling weight, a mechanical vibrator, or an explosive charge. Measurements are made of the time of travel from shockpoint to one or more detectors placed on the ground. Seismic surveys may be used to determine depth to, and quality of, bedrock; to locate upper surfaces of deep seated compact ore bodies; and to locate oil-bearing strata.

APPENDIX B

GUIDELINES FOR EXPLORATION AND MINING USE PERMITS AND ENVIRONMENTAL ASSESSMENT REPORTS

(The model forms and guidelines presented in this appendix are recommended by the Sierra Planning Organization Mining Task Force and do not necessarily represent official State policy or State law.)

RECOMMENDED GUIDELINES FOR COMPLETING MINING USE PERMIT APPLICATION

NOTE: THIS APPLICATION IS USED FOR MINERAL PROJECTS ONLY

The following items must be submitted to the County with a request for a use permit and reclamation plan. Additional pages may be used if required. Designate clearly the section and item to which each page refers. Incomplete application packets will not be accepted.

1. Completed Exploration and Mining Use Permit application.

2. Completed Mineral Exploration and/or Extraction Environmental Assessment.

3. Copy of the appropriate Recorder's map(s) indicating the location of the entire subject property. Copies of the map(s) may be obtained from the Recorder's office.

4. Copy of the deed(s) for the entire subject property. Copies of the deed(s) can be obtained from the Recorder's office. The deed(s) must show that the owner of the subject property is the same person who signed Line 12 of the Use Permit Application.

5. Copy of a notarized statement indicating that all owners of a possessory interest have been notified of uses described in both this application and supporting documents; i.e., lease agreements. (See Page 3 of Instructions for examples of Notarized Statements.)

6. Original site plan (tissue, sepia, or mylar) and fifteen (15) copies. The original site plan should be 18" by 26", or a size acceptable to the Planning Department, and capable of providing a clear blueprint machine reproduction. The site plan is the "map" of the proposed project, showing what is currently existing on the site and what is proposed as part of the project. Aerial photographs are suitable. One or more site plans may be utilized. and shall include the following:

   A. Face Sheet

      1. Project Name, if any
      2. Applicant's Name, and Agent (if appropriate)
      3. Property Owner's Name, if different from Applicant
      4. Assessor's Parcel Number(s)
      5. Existing Zoning
      6. Proposed Zoning, if different than existing zoning
      7. Source of Domestic Water (well, water agency, or other)

8. Source of Industrial Water
9. Method of Sewage Disposal (septic tank, sewer agency, or other)
10. Agency to Provide Fire Protection
11. Source of Topographic Information
12. Addresses of Property Owner, Applicant, and Agent

B. Vicinity map, showing the location of the subject property in relation to the surrounding area, and the proposed haulage routes.

C. Boundaries and existing topographic details of the site.

D. Topographic details after completion of reclamation.

E. Location of all existing and proposed access roads.

F. Location and identification of areas to be explored and/or mined, waste dumps, top soil storage piles, tailings ponds, and other areas of surface disturbance.

G. Location of existing and proposed structures, utility structures, utility facilities, and wells.

H. Existing stream channels and other bodies of water and proposed modifications.

I. By use of overlay symbol or color, depiction of separate exploration or mining phases.

J. Orientation (north arrow) and scale (e.g., 1"=55') of the map.

K. Location of exploration drill sites, trenching and other proposed activities.

L. Location and identification of historical mining activity.

M. Typical berms, pit walls, stream diversions, tailings, storage areas, and waste dumps; and typical scale sections of each.

N. Identification of mineral acres, if different from Assessor's Parcel Number.

O. Identification of existing tunnels, if applicable.

EXAMPLE OF NOTARIZED STATEMENT (NO. 1)

Agency
Address
City, State, Zip Code

ATTENTION: Planning Director

TO WHOM IT MAY CONCERN:

We, the undersigned, acknowledge that we are owners of the ______________ rights and have been duly notified of the proposed uses or potential uses identified in the Reclamation Plan and Use Permit submitted by ____ for the property identified as ____.

____
Signature

____
Signature

EXAMPLE OF NOTARIZED STATEMENT (NO. 2)

I, ____________________, hereby acknowledge that all owners of possessory interest (surface and mineral rights) have been duly notified of the proposed uses or potential uses identified in the Reclamation Plan and Use Permits submitted by _____________________ for property identified as __________________________.

____
Signature

____
Signature

MODEL APPLICATION FORM FOR EXPLORATION AND/OR MINING PERMIT

________ COUNTY

Please Print or Type

1. Date ________________

2. Name of proposed project ____

   Exploration ____ Mining ____

3. Applicant (Operator) ____

   ____

   Address Telephone

4. Agent or Contact Person ____

   ____

   Address Telephone

5. Owner of Mineral Rights ____

   ____

   Address Telephone

6. Owner of Surface Rights ____

   ____

   Address Telephone

7. Briefly describe type of proposed operation. Specify surface, underground, in-stream, etc.

   ____

   ____

8. Type of Deposit ___ Hardrock ___ Placer ___ In-stream ___ Other (specify)________

9. Existing Zoning ____

10. Proposed Zoning ____

11. General Plan Designation ____

12. Project Location (driving instructions)________________________________

    ____

13. Assessor's Parcel Number(s) ________________________________

    Section ____________ Township ____________ Range ____________

    Nearest community or town ________________________________

    Address of project site (if one exists) ________________________

14. Signature of at least one of the mineral rights owners, or a copy of the appropriate agreements.

____ ________________

____ ________________

_____ Check here if a copy of the appropriate agreement is attached.

15. Applicant's Statement of Responsibility

By submittal of this application, the applicant does hereby accept the responsibility to operate and reclaim the proposed project consistent with the conditions of approval imposed by the County on the Reclamation Plan and Use Permit.

____ ________________
Signature Date

____
Printed Name

__________ COUNTY

MINERAL EXPLORATION AND/OR EXTRACTION

ENVIRONMENTAL ASSESSMENT

NOTE: The environmental assessment provides information required for the processing of your application. Incorrect or incomplete information may cause a delay in processing. This form should be completed by the applicant, or his/her authorized representative.

1. Applicant or Project Name ______________________________

2. Describe the existing natural features of the subject property, including topography, vegetation, drainage, year round streams, bodies of water. (Exhibits should supplement written description.) ______________________________
____
____
____
____

3. Describe the existing man-made features of the subject property, including buildings, roads, wells, septic systems. (Attach exhibits.) ______________________________
____
____
____

4. Describe surrounding land uses and distances within the vicinity of the subject property, and distances of the surrounding land uses. Be specific. (Example: Five single-family residences 500 feet to the north; a duplex 200 feet and a pine forest adjacent to the west; a state highway and gas station 200 feet to the east; and grazing land immediately to the south.) (Attach exhibits.) ______________________________
____
____
____

5. Mineral(s) to be explored and/or mined ______________________________
____

6. Mining method(s) (Check all applicable.)

_____ Open Pit
_____ Hilltop Quarry
_____ Sidehill Quarry
_____ Low Level Quarry
_____ Gravel/Sand Pit
_____ Gravel Bar Skimming
_____ Clay Pit
_____ Borrow Pit
_____ Single Bench
_____ Multiple Bench
_____ Underground

_____ Drill and blast
_____ Shovel
_____ Dragline
_____ Waste Dump
_____ Tailings Ponds
_____ Truck to Processing Plant
_____ Rail Transport
_____ Slurry Pipeline
_____ Other (specify)
____
____

7. Exploration method(s) (Check all applicable.)

A. Test trenches
_____ backhoe
_____ tractor
_____ other (specify)
____

B. Drilling
_____ rotary
_____ core
_____ wagon drill
_____ other (specify)
____

C. Seismic
_____ explosives
_____ non-explosive

D. Dredging

E. Sluicing

F. Other (specify)
____

8. Proposed Sampling Method;
Describe equipment and time period.

A. Bulk sample
B. Grab sample
C. Channel sample
D. Other (specify)

____

Estimated total samples (volume) ____
Depth of samples ____

9. Is the proposal an exploration or expansion of an existing and/or historic mine?
_____ Yes _____ No If yes, describe briefly (specify existing, historic, or both.)

____
____
____

10. Geologic description, including general geologic setting, more detailed geologic description of the mineral deposit to be explored or mined, and principal minerals or rock types present.

____
____
____
____

11. Estimated Time Frames	Begin	End
Exploration	_______________	_______________
Construction	_______________	_______________
Operation	_______________	_______________
Reclamation	_______________	_______________

For seasonal operation, list operating months ______________________________

12. Will there be any potentially hazardous materials, such as toxic substances, flammables, or explosives used or stored at the site? _____ Yes _____ No

If yes, describe the method of use, storage, and disposal ______________________________

____

____

13. Estimated number of employees

Exploration Phase _______________ Construction Phase _______________
Reclamation Phase _______________ Operational Phase(s) 1. __________
2. __________
3. __________

14. Describe the proposed access to the project

_____ Frontage on County/State highway
_____ Private Road Easement _____ width _____ length
From what County or State road? ______________________________
_____ Prescriptive Right
_____ Other (explain) ______________________________

15. Will the project involve off-site hauling of samples, sand, aggregate ore, waste, or other mined material? _____ Yes _____ No If Yes, specify

A. Number of one-way truck trips per day: Peak _______ Average ________
B. Number of one-way truck trips per week: Peak ________ Average ________

16. Describe proposed on-site and off-site road improvements

A. On-site Width ________ Surface ______________________________
Location ______________________________

B. Off-site Width ________ Surface ______________________________
Location ______________________________

17. If sampling is done on-site, describe the treatment process (type of chemicals, method, size, and type of equipment). ______________________________

____

____

____

____

18. Exploration activities

A. Operating hours ______________________________
B. Days of the week ______________________________

19. Describe the mineral recovery process (type of chemicals, method, size and type of crushing equipment). ______________________________

____

____

____

Location of the recovery process(es) ____________________
____
____

20.

Mining activities	Operating hours	Days of the Week
Blasting	________	________
Off-site hauling	________	________
Ore extraction	________	________
Crushing/processing	________	________
Other (specify)		
________	________	________
________	________	________

21. Industrial water requirements

Amount required per day ____________________
Source ____________________

22. Source of domestic water

Private well _____ Water district (specify which) ____________________
Other ____________________

23. Method of sewage disposal

Septic system _____ Sewer district (specify which) ____________________
Holding tank _____ Other ____________________

24. Method of trash disposal

Individual hauling to dump _____ Garbage service (specify which) ____________________
Other ____________________

25. Agency to provide fire protection ____________________

26. Source of power

PG&E, SMUD, etc. _____ Generator (diesel or gas, specify size and quantity) ____________________
____

27. Method of dust control ____________________
____
____

28. Noise Levels

A. Determine average noise levels (L_{eq})*, in dBa, at the property line for three time periods: Day (7 a.m. to 7 p.m.), Evening (7 p.m. to 10 p.m.), and Night (10 p.m. to 7 a.m.).

28. Noise Levels (Continued)

	Existing (Pre-project	Construction	Operational	Reclamation
Day	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa
Evening	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa
Night	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa
Weekend/ Holidays	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa	_____ (m) dBa _____ (e) dBa

(m) = measured (e) = estimated

* L_{eq} is the sound level corresponding to a steady-state (A-weighted) sound level containing the same total energy as a time-varying signal over a given sample period. L_{eq} is typically computed over 1, 8, and 24 hour sample periods.

Obtain Jurisdiction's Noise Ordinance or Noise Element for comparison of acceptable noise levels.

29. Are there any sites of historical or archaeological interest on the subject property?
Yes _____ No _____ If Yes, explain ____
____

30. Is all or a portion of this property subject to a Williamson Land Act contract (i.e., an agricultural preserve)? Yes _____ No _____

Is all or a portion of this property zoned TPZ? Yes _____ No _____
If Yes, contact the appropriate County Planning Department or Agricultural Commissioner.

31. Anticipated annual production (include all mined materials such as overburden, waste rock, ore, etc.) ____
____

32. Total life cycle production

A. Mine waste returned to pit ______________________________
B Aggregate/crushed rock to off-site uses ______________________________
C. Mine waste returned off-site ______________________________
D. Mine waste disposed off-site ______________________________

33. Ground water

A. Estimated ground water depth: __________ feet
B. Maximum tunnel/pit depth: __________ feet
C. Estimated daily/annual quantity of water pumped for de-watering __________ feet

34. Maximum amount of surface disturbance, including drill pads, trenching, access roads, etc. ________ acres

35. If the nature of the deposit and the exploration and/or mining method used will permit, describe and show the steps or phases of the mining operation that allow concurrent reclamation, and include a proposed time schedule for such concurrent activities. ____________

36. Describe the ultimate physical condition of the site and specify proposed use(s), or potential uses, of the mined lands as reclaimed. ____________

37. For operations occurring within or adjacent to a seasonal or permanent stream, river, or other body of water, describe actions being taken to protect water quality and wildlife habitat. ____________

38. Describe any actions being taken during the project and as part of the reclamation process that will enhance wildlife habitat. ____________

39. Identify State or Federal agencies that require permits, leases, or licenses, and the type to be issued. ____________

CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

____
Date

____
Signature of applicant or authorized representative

MODEL OUTLINE OF RECLAMATION PLAN AND RECOMMENDED GUIDELINES FOR PREPARATION

Key Elements and Practices Included in a Reclamation Plan

A. Graphics

1. Overview of project site in relation to watershed and major cultural features.
2. Cross-sections--north, south, east, and west--prior to and after mining.
3. Accurate elevation lines.
4. Description of pit or project limit, showing maximum area of mining site.

B. Conservation Practices

1. Stockpile top soil for use as vegetative medium.
2. Slopes - 2:1 or 1½:1, depending on material.
3. Benching - eight to ten feet wide and established every twenty feet on slope.
4. Drainage - provide proper drainage for site (interceptor ditches, berms, dikes).
5. Vegetation - replace with existing plant species.
6. Sediment retention structures.
7. Established work season - limit earthmoving activity to specific times of the year.

C. Project Phasing

1. Insure that reclamation is concurrent with mining.
2. Insure that previously mined sections are reclaimed prior to further mining.

D. Performance Bonding

1. Amount of bond should equal cost of winterizing project, plus amount necessary to reclaim property to alternative use.

E. Management Follow-Up Program

1. Design program to monitor and maintain conservation practices implemented during reclamation process.

F. Compliance Scheduling

1. Schedule inspections by County or Authorized Agency to check compliance with Reclamation Plan.

Guidelines for Preparation of a Reclamation Plan

Following are instructions for specific items of the plan:

Items 1-7: Where applicable, indicate "Same as Applicant."

Item 3: If more than one owner is involved, enter name and address of each. If more than one parcel is included in the operation, enter the owners of each parcel. This information is required to comply with Item 25. If the surface and mineral rights are separated, show the owner of surface rights under Item 3. For Federal land, enter USA as owner, and list administering agency, e.g., USFS, BLM, NPS, etc.

Item 4: Enter owner of mineral rights, if different than surface owner. If a mining claim, indicate the owner(s) of the possessory rights (claim owner).

Item 6: Enter the name(s) of individual, partnership, corporation, etc. If a joint venture, also show name of managing person or concern.

Item 7: If actual reclamation is to be done by a person or agency other than the applicant or operator, indicate the name and address of person or agency.

Item 8: Briefly describe the land to be mined, either in metes and bounds or by land office subdivisions. Include legal description. Show section(s), township, and range.

Item 10: It is suggested that the Location and Vicinity Map be shown on USGS 7½ minute topographic quadrangle sheet (scale: 1"-2000") unless larger scale maps are available. If 7½ sheets are not available, or if the operation is extensive, 15 minute sheets (scale: 1"-1 mile) may be used. Contours, roads, drainage, adjacent towns, etc., should be shown, as well as the site of the operation.

Item 12: A brief, concise answer is requested for this item, including only essential data on geologic formations, structures, rocks and minerals, and the nature of the mineral deposit.

Item 13: If an Environmental Impact Report has been or is being filed for the project, the answer to this item may be brief and in outline form, with reference to the EIR. Reference to the EIR may be used to simplify answers to other pertinent items, also. Soil condition is covered in more detail in Item 26.

Item 14: If the applicant's surface mine was in operation on January 1, 1976, or the operation was conducted prior to that date, so state. If the applicant has elected to phase the operation, indicate duration of first phase. For anticipated life or long-term operations, show estimated range, e.g., 35-50 years.

Items 15 - 17: If more than one individual pit or quarry is included in the Plan, answer these items for each such operation. Include all ore, minerals, overburden, and waste as one total quantity. Note that either tons or cubic yards (in-place) are requested in Item 16. Cross out unit of measure not used.

Items 20 - 22: In the case of large, integrated operations with several separate pits or mines, it will be to the advantage of the applicant to answer these items in detail, not only to clarify the nature of the operation, but also to protect the applicant's vested rights under the provisions of the Act. The principal map should be of a scale sufficient to show the required details clearly. For a large operation, a smaller scale, overall map, with larger scale detail maps of critical areas may be more practical. In long-range operations, precision of detail is not as important as a clear exposition of the operation. The use of colored symbols or map overlays is recommended to simplify map preparation. Aerial photographs may be substituted for maps if they adequately provide the required information.

Items 23, 24: Applicant shall consult with the Lead Agency before completing these items.

Item 28: If essentially no reclamation may be accomplished during first phase, so indicate, and explain.

MODEL RECLAMATION PLAN

1. OWNER/OPERATOR/AGENT ____________________
Name

____
Address Telephone

2. NAME (if any) OF MINERAL PROPERTY ____________________

3. PROPERTY OWNER(S), OR OWNERS OF SURFACE RIGHTS (List all owners)

____
Name Address Telephone

____
Name Address Telephone

____
Name Address Telephone

____
Name Address Telephone

____
Name Address Telephone

4. OWNERS OF MINERAL RIGHTS

____
Name Address Telephone

____
Name Address Telephone

5. LESSEE

____
Name Address Telephone

____
Name Address Telephone

6. OPERATOR

____
Name Address Telephone

____
Name Address Telephone

7. AGENT OF PROCESS (Person designated by operator as agent for the service process)

____
Name Address Telephone

8. Give a brief description of the extent of the mined lands to be involved in this operation. Include legal description and total acreage.

Section(s) ____________ Township ____________ Range ____________

9. Describe the access route to the operation site
____
____
____

10. Attach Location and Vicinity Map.

DESCRIPTION

11. Mineral commodity to be mined ______________________________

12. Geologic Description - Briefly describe general geologic setting, with more detailed geologic description of mineral deposit to be mined, and principal minerals or rock types present.
____
____
____
____

13. Environmental Desciption - Briefly describe environment of site and surrounding area. Include existing area land use, soil, vegetation, ground water elevation, surface water characteristics, average annual rainfall and other factors pertaining to environmental impacts and their mitigation and reclamation.
____
____
____
____

PROPOSED/EXISTING SURFACE MINING OPERATION

14. Proposed starting date of operation __________
Estimated life of operation __________
Duration of first phase __________

15. Operation will be

continuous _____ seasonal _____ intermittent _____
developed, not yet in operation _____ temporarily deactivated _____
stockpile in mine _____

16. Operation will be

under 5,000 tons (cubic yards)/year _____
5,000-50,000 tons (cubic yards)/year _____
50,000-250,000 tons (cubic yards)/year _____
250,000-1,000,000 tons (cubic yards)/year _____
over 1,000,000 tons (cubic yards)/year _____

17. Total anticipated production

Mineral commodities to be removed __________ tons (cubic yards)
Waste retained on-site __________ tons (cubic yards)
Waste disposed of off-site __________ tons (cubic yards)
Maximum anticipated depth __________ feet

18. Mining Method (check all applicable)

_____ Open Pit
_____ Gravel/Sand Pit
_____ Single Bench
_____ Drill and blast

Quarry

_____ Hilltop
_____ Low Level
_____ Borrow Pit
_____ Rail
_____ Multiple Bench
_____ Shovel
_____ Gravel Bar Skimming
_____ Waste Dump
_____ Sidehill
_____ Underground
_____ Tailings Pond
_____ Truck to Processing Plant to Railroad
_____ Dragline
_____ Clay pit
_____ Slurry pump
_____ Other (specify) ____

19. If processing of mined ores or minerals is to be conducted at, or adjacent to, the site, describe briefly the nature of the processing and explain disposal method of tailings or waste from processing. ____

____
____
____
____

20. Estimate quantity (gallons per day) and quality of water required by the proposed operation, specifying proposed sources of this water; method of its conveyance to the site; quantity and quality of used and/or surplus water; and disposal of used and/or surplus water.

____
____
____
____

21. If the nature of the deposit and the mining method used permit, describe and show the steps or phases of the mining operation that allow concurrent reclamation. Include a proposed time schedule for such concurrent activities. ____

____
____
____
____

22. Attach map of the mined lands and/or suitable aerial photographs showing

A. Boundaries and topographic details of the site
B. Location of all streams, roads, railroads, water wells, and utility facilities within 500 feet of the site
C. Location of all currently proposed access roads to be constructed in conducting the surface mining operation(s)
D. Location of areas to be mined, and of waste dump and tailings pond
E. By use of color symbol or overlay, depiction of separate mining phases if applicable (see Item 21)
F. The source of map base, orientation (north arrow), and scale (e.g., 1"=500') of the map

RECLAMATION PLAN

23. Indicate on an overlay map of Item 22, or by color symbol on map, those areas to be covered by the reclamation plan.

Size of area ________ acres

24. Describe the ultimate physical condition of the site and specify proposed use(s) or potential uses, of the mined lands as reclaimed. ______________________________

25. Describe the relationship of the interim uses, other than mining, and the ultimate physical condition to:

A. Zoning regulations
B. General Plan and Plan elements
(County staff will provide this information)

26. Provide evidence that all owners of a possessory interest in the land have been notified of the proposed use(s) or potential uses identified in Item 24. Attach copy of notarized statement of acknowledgement, etc.

27. Describe soil conditions and proposed soil salvage plan.

____

28. Describe methods, sequence, and timing for bringing reclamation of the land to its end state. Indicate on map (Items 22-23) or on diagrams as necessary. Include discussion of the following items:

A. Backfilling and grading
B. Stabilization of slopes
C. Stabilization of permanent waste dumps, tailings, etc.
D. Rehabilitation of pre-mining drainage
E. Removal, disposal or utilization of residual equipment, structures, refuse, etc.
F. Control of contaminants, especially with regard to surface runoff and ground water
G. Treatment of streambeds and streambanks to control erosion and sedimentation
H. Removal or minimization of residual hazards
I. Resoiling and revegetation, with evidence that selected plants can survive the specific topography, soil, and climate of the site

29. If applicant plans short-term phasing of reclamation, describe in detail specific reclamation to be accomplished during first phase. ______________________________

30. Describe how reclamation of site in this manner may affect future mining at the site and in the surrounding area. ______________________________

APPENDIX C

SOURCES OF TECHNICAL ASSISTANCE

Below is a list of subjects most commonly associated with mining ventures, together with the federal, state, regional, or local agencies having jurisdiction in each matter. Following this are complete names and addresses for the agencies, along with specific contact personnel, when available.

AGRICULTURE	
Timberland Preserve Zones	State Department of Forestry City/County Planning Departments County Agricultural Commissioners
Williamson Act Contracts	City/County Planning Departments State Department of Conservation County Agricultural Commissioners
AIR	State Air Resources Board County Air Pollution Control District Mountain Counties Air Basin
ARCHAEOLOGY	State Office of Historic Preservation Local Historical Societies
FISHERIES	State Department of Fish and Game United States Forest Service
FIRE PREVENTION	County Fire Districts State Department of Forestry
GEOLOGY	
Geohydrology	State Water Quality Control Board
Geotechnology	State Department of Water Resources
Seismology/Faults	State Division of Mines and Geology
HAZARDOUS MATERIALS	
Chemicals/Heavy Metals	State Department of Health Services State Department of Fish and Game State Water Quality Control Board County Environmental Health Department
Explosives	County Sheriffs' Departments Cal-OSHA Federal Mine Safety & Health Administration

HISTORICAL RESOURCES - See ARCHAEOLOGY

HYDROLOGY - See WATER

LAND RESTORATION - See RECLAMATION

LAND USE	City/County Planning Departments
MINING METHODS	Local Mining Advisory Board/Association Regional Resource Conservation District State Division of Mines and Geology United States Forest Service
NOISE	County Health Departments County Planning Departments State Office of Noise Control
PERMITS AND APPROVALS	
Dam Construction Approval	State Department of Water Resources State Water Resources Control Board
Explosives Permit	County Sheriffs Cal-OSHA State Highway Patrol
Hazardous Waste Disposal Permit	State Department of Health Services, Hazardous Waste Management Branch
Highway Encroachment	
State	CALTRANS
County	County Public Works Departments
Land Use Permit	County Planning Departments
Reclamation Plan Approval	County Planning Departments
Sewage Permit	County Environmental Health Departments
Sewer Service Permit	Regional Water Agencies
Solid Waste Disposal Permit	County Environmental Health Departments
Streambed Alteration Permit	Department of Fish and Game
Waste Discharge Permit	State Water Quality Control Board, Central Valley Region
Water Appropriation Permit	State Division of Water Rights, Environmental Unit
Water Service Permit	Regional Water Agencies
RECLAMATION	County Planning Departments Regional Resource Conservation District State Department of Fish and Game State Department of Forestry State Division of Mines and Geology, Reclamation Program State Water Quality Control Board United States Forest Service

SAFETY	County Sheriffs State Highway Patrol Cal-OSHA United States Environmental Protection Agency United States Mine Health and Safety Administration
SOIL	
Acidity Erosion Management Restoration	Regional Resource Conservation District State Water Quality Control Board
TIMBER	State Department of Forestry United States Forest Service
TRAFFIC	County Department of Public Works Regional Transportation Commission (Includes all city and county governments within a county; contact through Department of Public Works) State Department of Transportation
VEGETATION	State Department of Fish and Game United States Forest Service
WATER/HYDROLOGY	
Quality	State Department of Fish and Game State Water Quality Control Board State Water Resources Control Board
Quantity	State Department of Water Resources
WATER RIGHTS	State Department of Water Resources State Water Resources Control Board, Division of Water Rights
WILDLIFE	State Department of Fish and Game United States Forest Service

COUNTY AGENCIES

AGRICULTURAL COMMISSIONERS

Edio Delfino
El Dorado County Agricultural Commissioner
311 Fair Lane
Placerville, CA 95667
(916) 626-2305

John Taylor
Nevada County Agricultural Commissioner
255 South Auburn Street
Grass Valley, CA 95945
(916) 273-2648

John Wilson
Placer County Agricultural Commissioner
11477 E Avenue
Auburn, CA 95603
(916) 823-4371

Fred Serber
Sierra/Plumas County Agricultural Commissioner
208 Fairground Road
Quincy, CA 95971
(916) 283-1155

AIR POLLUTION CONTROL

El Dorado County Air Pollution Control District
360 Fair Lane
Placerville, CA 95667
(916) 626-2407

Nevada County Air Pollution Control District
10433 Willow Valley Road
Nevada City, CA 95959
(916) 265-1452

Placer County Air Pollution Control District
11484 C Avenue
Auburn, CA 95603
(916) 823-4443

BUILDING DEPARTMENTS

El Dorado County Building Department
360 Fair Lane
Placerville, CA 95667
(916) 626-2511

Nevada County Building Department
10433 Willow Valley Road
Nevada City, CA 95959
(916) 265-1444

Placer County Building Division
11424 B Avenue
Auburn, CA 95603
(916) 823-4401

Sierra County Building Department
Courthouse Square
Downieville, CA 95936
(916) 289-3251

ENVIRONMENTAL HEALTH

El Dorado County Environmental Health Department
360 Fair Lane
Placerville, CA 95667
(916) 626-2411

Nevada County Environmental Health Department
10433 Willow Valley Road
Nevada City, CA 95959
(916) 265-1452

Placer County Environmental Health Department
11484 B Avenue
Auburn, CA 95603
(916) 823-4361

Sierra County Health Department
Courthouse Square
Downieville, CA 95936
(916) 289-3274

County Agencies (Continued)

PLANNING DEPARTMENTS

El Dorado County Community Development Department
Richard M. Floch, Director
360 Fair Lane
Placerville, CA 95667
(916) 626-2438

Nevada County Planning Department
Don R. Riolo, Director
10433 Willow Valley Road
Nevada City, CA 95959
(916) 265-1440

Placer County Planning Department
Thomas D. McMahan,. Director
11414 B Avenue
Auburn, CA 95603
(916) 823-4721

Sierra County Planning Department
Tim H. Beals, Director
Courthouse Annex
P.O. Box 530
Downieville, CA 95936
(916) 289-3271

PUBLIC WORKS DEPARTMENTS

El Dorado County Public Works Department
Art Cort, Director
Missouri Flat and Headington Roads
Mail: 360 Fair Lane
Placerville, CA 95667
(916) 626-2347 - Includes Encroachment Permit Applications

Placer County Public Works Department
John Maccoun, Director
11444 B Avenue
Auburn, CA 95603
(916) 823-4515
(916) 823-4670/823-4370 - Encroachment Permit Applications

Nevada County Public Works Department
Wesley W. Zachary, Acting Director
582 Searls Avenue, Nevada City
107 Argall Way, Nevada City
Mail: Nevada County Courthouse
Nevada City, CA 95959
(916) 265-1411 - Encroachment Permit Applications
(916) 265-1415 - Encroachment Problems

Sierra County Public Works Department
Brenda Mitchell
P.O. Box 98
Downieville, CA 95936

SHERIFF DEPARTMENTS

El Dorado County Sheriff
300 Fair Lane
Placerville, CA 95667
(916) 626-2211

Nevada County Sheriff
Courthouse Square
Nevada City, CA 95959
(916) 265-1370

Placer County Sheriff
11500 A Avenue
Auburn, CA 95603
(916) 823-4321

Sierra County Sheriff
Courthouse Square
Downieville, CA 95936
(916) 289-3234/289-3237

REGIONAL AGENCIES

AIR POLLUTION CONTROL

Mountain Counties Air Basin Engineering
Earl Withycombe, Consultant
P.O. Box 5
Sierra City, CA 96125
(916) 862-1233

CONSERVATION DISTRICT

High Sierra Resource Conservation and Development Area
Bob Roan, Coordinator
251 Auburn Ravine Road
Auburn, CA 95603
(916) 823-6830

WATER AGENCIES

El Dorado County

El Dorado Irrigation District
Ron Jones, Director of Operations and Maintenance
P.O. Box 1608
Placerville, CA 95667
(916) 622-4513

Nevada and Placer Counties

Donner Summit Public Utility District
Steve Beucus, District Manager
P.O. Box 7
Soda Springs, CA 95728
(916) 426-3456

Nevada Irrigation District
Del Hedges, Director of Operations
P.O. Box 5348
Auburn, CA 95604
(916) 878-1857
P.O. Box 1019
Grass Valley, CA 95945
(916) 273-6185

Placer County Water Agency
George Uyeno, Plant Superintendent
185 Ferguson Road
Mail: P.O. Box 6570
Auburn, CA 95604
(916) 885-2411

Sierra County

Sierra County Health Department
Elizabeth Greenberg, Sanitarian
P.O. Box 517
Loyalton, CA 96118
(916) 993-4118
Courthouse Square
Downieville, CA 95936
(916) 289-3274
or
Sierra County Planning Department

STATE AGENCIES

AIR RESOURCES

Air Resources Board
Technical Support Division
1131 S Street
Sacramento, CA 95814
(916) 322-5350

Stationary Source Division
1102 Q Street
Sacramento, CA 95814
(916) 445-0650

Compliance Division
1102 Q Street
Sacramento, CA 95814
(916) 322-6022

CONSERVATION DEPARTMENT

Land Resource Protection Division
1516 Ninth Street, Room 400
Sacramento, CA 95814
(916) 324-0859

Mines and Geology Division
Division Headquarters
1416 Ninth Street
Sacramento, CA 95814
(916) 323-8555

Environmental Geology Officer
610 Bercut Drive
Sacramento, CA 95814
(916) 322-2562

Geophysics Officer
2815 O Street
Sacramento, CA 95814
(916) 322-4489

State Geologist
1416 Ninth Street
Sacramento, CA 95814
(916) 445-1923

ENVIRONMENTAL AFFAIRS

Environmental Affairs Agency
Gordon Duffy, Secretary
1102 Q Street
Sacramento, CA 95814
(916) 322-5840

FISH AND GAME

Wildlife Management
Eldridge Hunt
1416 Ninth Street, 12th Floor
Sacramento, CA 95814
(916) 445-5561

Environmental Services Branch
Don Lollock
(916) 445-1383

Wildlife Protection Branch
(916) 445-5431

Rancho Cordova Field Station
Fish and Wildlife Pollution Control Laboratory
Dick Hansen, Supervisor
2005 Nimbus Road
Rancho Cordova, CA 95670
(916) 355-0856

STATE AGENCIES

FORESTRY DEPARTMENT

Forestry Department Resource Management
Environmental Protection
1416 Ninth Street
Sacramento, CA 95814
(916) 322-2996

HEALTH AND SAFETY

Occupational Health and Safety Division (Cal OSHA)
Mining and Tunneling Unit
Stan Rhyu, Associate Safety Engineer
1800 Coffee Road, Building J, Suite 55
Modesto, CA 95355
(209) 576-6260

Health Services Department

Environmental Health Division
Harvey Collins, Chief
714 P Street, Room 430
Sacramento, CA 95814
(916) 322-2308

Hazardous Materials Laboratory Section
Robert Stephens, Chief
2151 Berkeley Way
Berkeley, CA 95704
(415) 540-3003

FEDERAL AGENCIES

Army Corps of Engineers
Sacramento District
Federal and Courthouse Building
600 Capitol Mall
Sacramento, CA 95814
(916) 440-2292 - Information
(916) 440-2324 - Permits
(916) 440-2487 - Engineering

Alcohol, Tobacco, and Firearms Bureau
801 I Street
Sacramento, CA 95814
(916) 440-2805

Environmental Protection Agency
Region IX
Carl Kohnert, Jr.
215 Fremont Street
San Francisco, CA 94105
(415) 974-8071

Land Management Bureau

Division of Technical Services
2800 Cottage Way
Sacramento, CA 95825
(916) 484-4875

Foothill County Region
Deane Swickard
Larry Vrendenberg
David Harria
63 Natoma Street
Folsom, CA 95836
(916) 985-4474

Mine Health and Safety Administration
Thomaa Lukina, Western District Manager
620 Central Avenue, Building 7
Alameda, CA 94501
(415) 273-7457

Federal Agencies (Continued)

NATIONAL FOREST SERVICE

El Dorado National Forest
Norm Scott
100 Forni Road
Placerville, CA 95667
(916) 622-5061

Tahoe National Forest

Downieville Ranger District
District Ranger
North Yuba Ranger Station
Star Route, Box 1
Camptonville, CA 95922
(916) 288-3231

Foreathill Ranger District
District Manager
22830 Foreathill Road
Foresthill, CA 95631
(916) 367-2224

Nevada City Ranger District
District Manager
12012 Sutton Way
Graaa Valley, CA 95945
(916) 273-1371

Sierraville Ranger District
District Ranger
Highway 89
P.O. Box 95
Sierraville, CA 96126
(916) 994-3401

Truckee Ranger District
District Ranger
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APPENDIX D

NOISE MEASUREMENTS AND COMPARISONS

The purpose of this Appendix is to present the noise levels generated by mining operations in context with noise levels and noise sources commonly associated with community living. Although the text contains many technical references, the charts offer clear comparisons between mining-generated noises and those emanating from everyday environmental sources.

The terms used in this work to describe sound are:

Decibel (dB)

A numerical unit, based on mathematical formulae, used to describe the range or extent (amplitude) of sound. Zero dB equals the threshold of normal hearing.

A-Weighted Sound Level

The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise. Sound pressure levels weighted using this filter are labeled dBA.

Ambient Noise Level

The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Figure 7 is a chart showing examples of noise levels from various common sources, and normal human responses to the levels. Using this chart, one can judge the noise impacts of the mining equipment listed below:

EQUIPMENT	dBA LEVEL AT 1600 FEET
Backhoe, Frontloader, Bulldozer	60-64
Backhoe, Loader (Small Model)	55
Drill Rig	60-64
Trucks, Other Heavy Equipment	60-64
Portable Air Compressor	55
Generator	64
Jaw Crusher (10" by 36")	45
Ball Mill	55-60

EXAMPLES OF NOISE LEVELS

Activity	Level, dBA	Response
Carrier Deck Jet Operation	140	
		Painfully Loud
Jet Takeoff (200 Feet)	130	Limit Amplified Speech
	120	
		Maximum Vocal Effort
	110	
Locomotive Horn (50 Feet) Auto Horn (3 Feet)		
	100	
		Very Annoying
Locomotive (50 Feet) Heavy Truck (50 Feet) Drill Rig (50 Feet)	90	
	80	Annoying
Air Compressor (50 Feet)		
	70	
		Intrusive
Air Conditioning Unit (20 Feet)	60	
	50	Quiet
Living Room		
Bedroom	40	
Whisper	30	Very Quiet
Broadcasting Studio	20	
	10	Just Audible
	0	Threshold of Hearing

FIGURE 7. Examples of Noise Levels

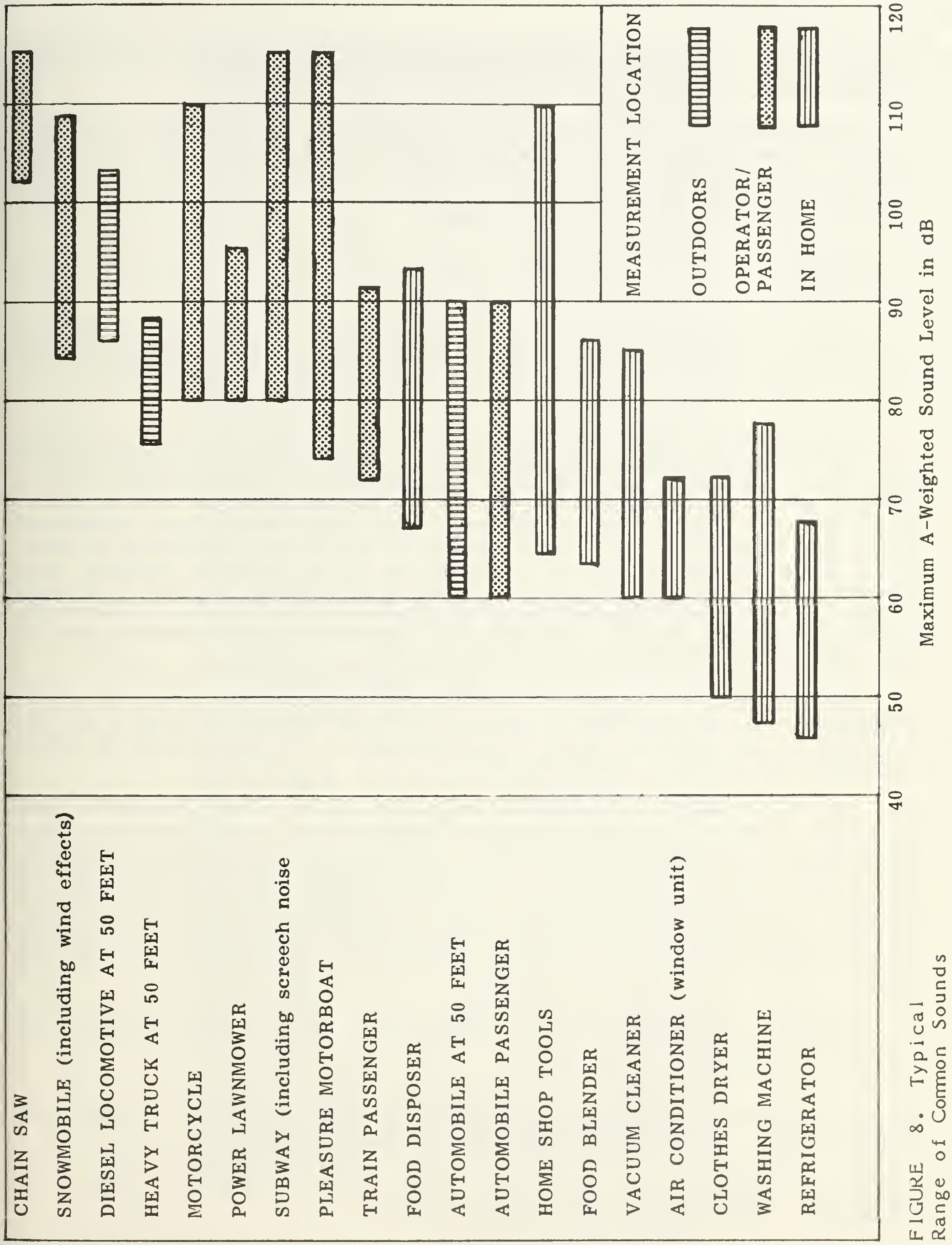

FIGURE 8. Typical Range of Common Sounds

Note that the highest noise level from any of this equipment, at a distance of 1,600 feet, barely reaches the 'intrusive' category, and that some of the equipment falls into or below the 'quiet' zone.

Another aspect of evaluating sound impact is the type of noise being generated. A jaw crusher, for example, operates at approximately the same noise level as that of the average living room; however, the sound of a jaw crusher in operation is hardly a typical living room sound, and for this reason the subjective reaction may rate it as very intrusive noise.

Figures 8 and 9 further illustrate noise levels commonly occurring within the community.

Vibration and airblast standards are not usually included in local regulations or policies. Acoustical literature contains study results that indicate acceptable levels of vibration from the standpoint of preventing structural damage, and acceptable levels of air blast noise for prevention of undue annoyance.

Ground-borne vibration amplitude due to blasting is influenced by charge size and by the physical characteristics of the mineral formations surrounding the blast site. The most commonly used descriptor of ground movement due to blasting is the "maximum particle velocity," as this parameter is best correlated with structural damage and annoyance. Some jurisdictions have established regulations limiting the size of blast charges on this basis. Calculation of allowable charge weights to protect receivers at given distances depends upon measuring or reasonably estimating a "ground transmission constant," although general guidelines for allowable charge size are available. Figure 10 shows the criteria for quarry blasting established by the State of New Jersey in lieu of calculating charge size based upon seismographic measurements.

For vibration, a peak particle velocity of 1.92 inches per second is usually considered to be an upper limit to prevent structural damage, although a ten-fold reduction in that criterion, to 0.2 inches per second, has been argued to reduce complaints and provide a margin of safety.

Air blast noise levels should not exceed a peak of 120 dB (Linear) to prevent people from being "very annoyed." Note that the "peak" level referenced employs the peak response mode of the sound level meter, and is not A-weighted. The resulting level is not directly comparable to the A-weighted standards cited elsewhere in this document in terms of meter response and presumed frequency content. See Figure 11 for an illustration of the differences in level and frequency content between peak noise levels as applied to blasting criteria and the maximum noise level generated by a more common noise source, an automobile horn.

Additional information on noise impacts, noise control, and ordinances and regulations regarding noise follows:

"LET'S REDUCE THE NOISE FROM BLASTING," E.I. Du Pont de Nemours and Company, Inc., Explosives Department, Wilmington, Delaware

"HUMAN RESPONSE TO BLASTING NOISE AND VIBRATION," George W. Kamperman, Inter-Noise 80, Vol. II, pp. 979-984

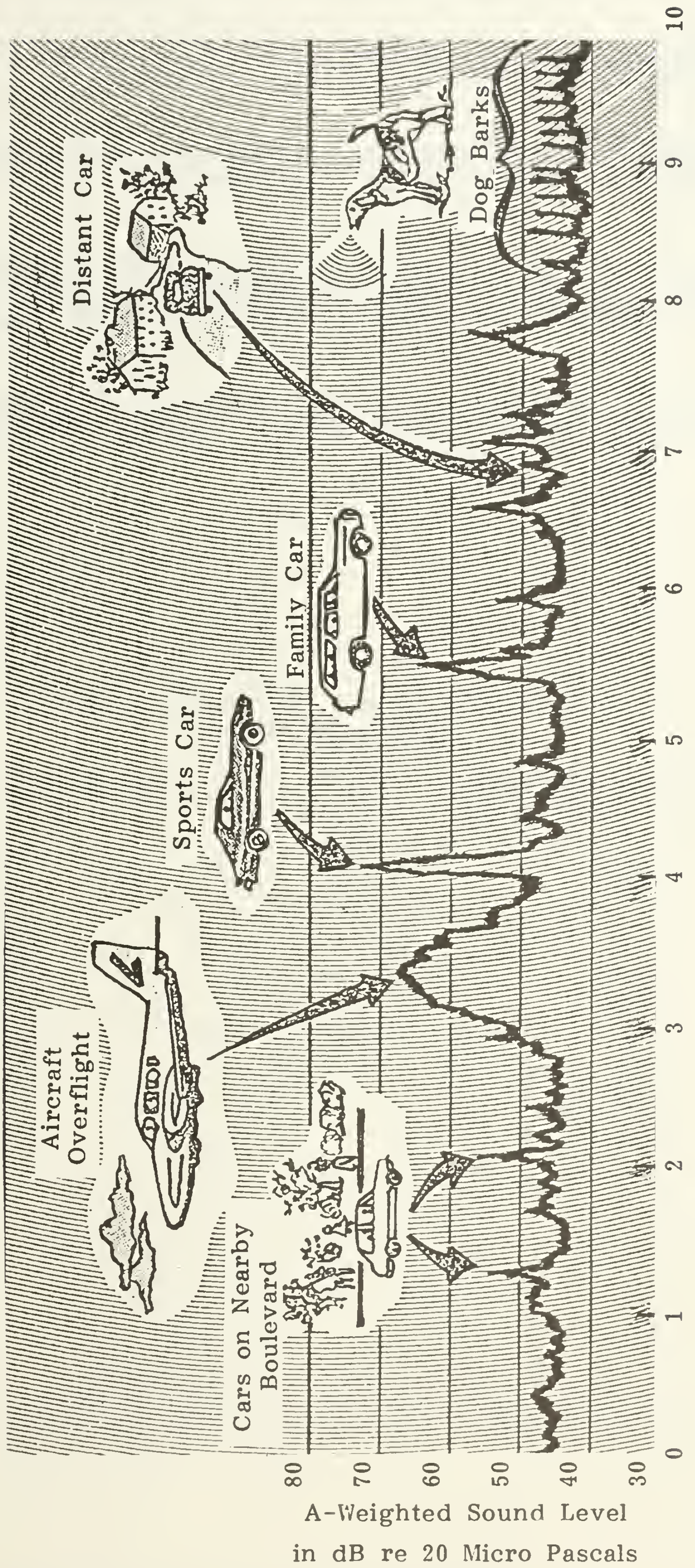

FIGURE 9. Typical Outdoor Sounds

MODEL COMMUNITY NOISE CONTROL ORDINANCE, Office of Noise Control, California Department of Health, April 1977

MODEL COMMUNITY NOISE CONTROL ORDINANCE, EPA 550/9-76-003, United States Environmental Protection Agency, September 1975

INFORMATION ON LEVELS OF ENVIRONMENTAL NOISE REQUISITE TO PROTECT PUBLIC HEALTH AND SAFETY WITH AN ADEQUATE MARGIN OF SAFETY, EPA 550/9-74-004, United States Environmental Protection Agency, March 1974

GUIDELINES FOR THE PREPARATION AND CONTENT OF NOISE ELEMENTS OF THE GENERAL PLAN, Office of Noise Control, California Department of Health, February 1976

ALLOWABLE CHARGE SIZE VERSUS DISTANCE
STATE OF NEW JERSEY

Distance from blast area to nearest residence, in feet	Maximum charge per shot or delay, in pounds
100	75
200	92
300	116
400	140
500	176
600	209
700	259
800	330
900	403
1,000	495
1,200	770

FIGURE 10. Allowable Charge Size Versus Duration

GENERALIZED BLASTING NOISE SPECTRUM COMPARED TO AN AUTO HORN AT 3 FEET

BLASTING SPL = 108 dB (linear); 72 dBA, "Peak" response
AUTO HORN SPL = 108 dB (linear); 105.5 dBA, "Fast" response
Source: G.W. Kamperman, 1979
Brown-Buntin Associates, 1981

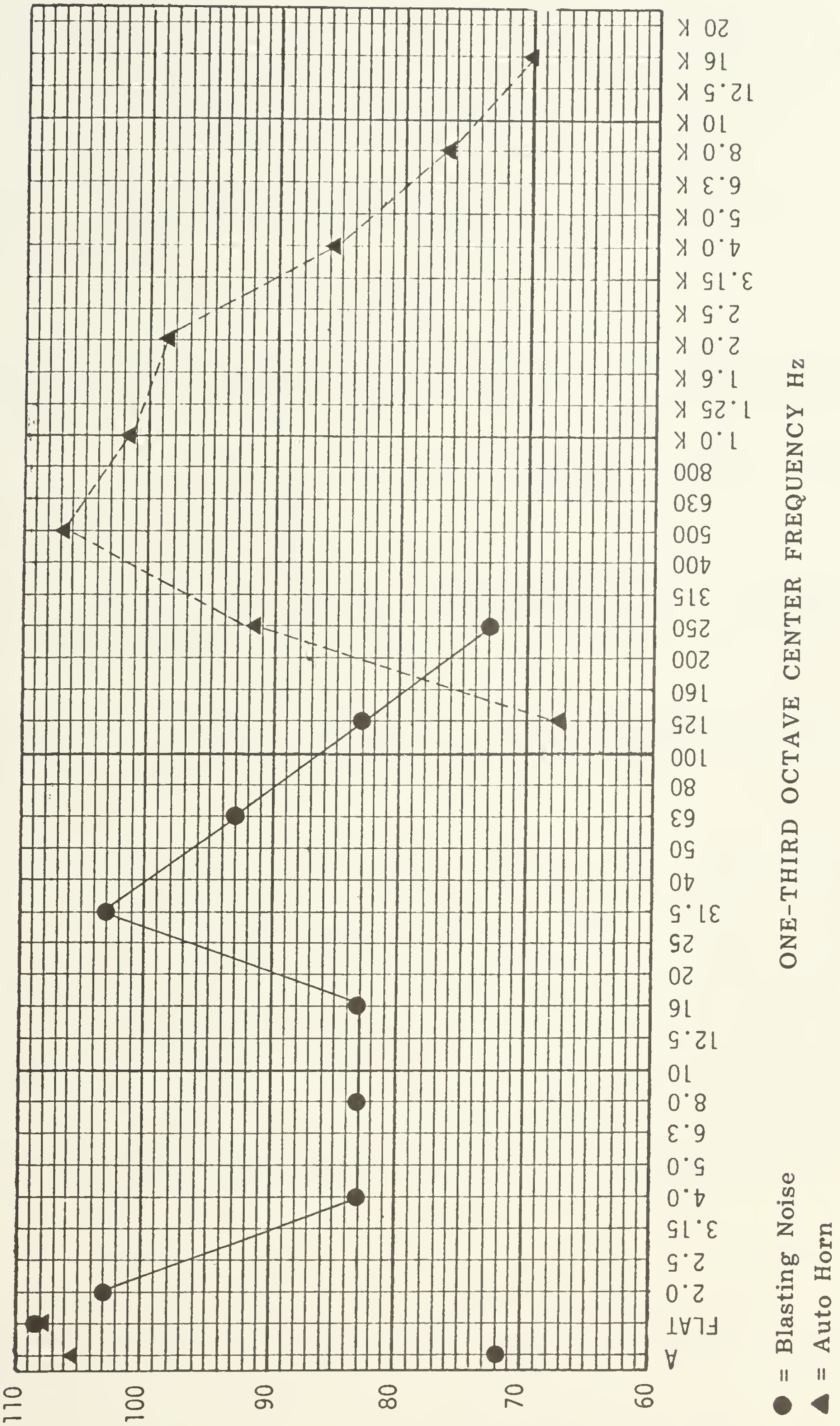

FIGURE 11. Generalized Blasting Noise Spectrum

APPENDIX E

NEVADA COUNTY HEALTH DEPARTMENT
HAZARDOUS MATERIALS STORAGE ORDINANCE

CHAPTER XI. Article I - HAZARDOUS MATERIALS STORAGE AND USE

Sec L-X 1.1 FINDINGS AND PURPOSE

The Nevada County Board of Supervisors finds and declares:

(A) Hazardous materials present in the community may pose acute and chronic health hazards to individuals who live and work in Nevada County, and who are exposed to such substances as a result of fires, spills, industrial accidents, or unauthorized discharges.

(B) Basic information on the location, type, and the health risks of hazardous materials used, or stored, in Nevada County is not now available to firefighters, health officials, planners, and elected officials.

(C) It is the intent of the Nevada County Board of Supervisors that the system of disclosure set forth in this Chapter shall provide the information essential to firefighters, health officials, planners, and other county officials in meeting their responsibilities and assure that trade secrecy is not abridged.

(D) Due to the threat to the security of any particular facility posed by the disclosure of the information in the Facility Map described in Sec. 5.2 (2), this information shall be maintained by the Nevada County Health Officer and the Nevada County Safety Officer for law enforcement purposes only and shall not be made public.

(E) Any Nevada County property owner--property owners, renters or lessees--who has property that could be affected by the release of hazardous materials from a nearby hazardous materials storage facility will be provided upon request the generic name and quantities of any or all hazardous materials, about which Nevada County has information, that are being used under the above stated conditions. The determination of whether the release of the information is necessary for the protection of property or people will be made by a consultation among (1) the Nevada County Health Officer, (2) the Nevada County Planning Director, and (3) the Nevada County Sheriff. Two of the three must agree that the information may be released to the inquirer. The decision shall be made within fifteen (15) days of the request. The request for the information and the decision shall be in writing. Any denial of the release of information may be appealed to the Board of Supervisors within fifteen (15) days of the tender of the written decision. Any appeal shall set forth with particularity the grounds of the appeal. The Board shall act on any such appeal within sixty (60) days of the filing thereof.

Sec. L-X 1.2 DEFINITIONS

For the purpose of this chapter, terms listed in this section shall be defined as follows:

(A) Abandoned, when referring to a storage facility, means out of service and not safeguarded in compliance with this Chapter.

(B) Business means an employee, self-employed individual, trust, firm, joint stock company, corporation, partnership, association, county, special district, or any department or agency thereof. For the purpose of this Chapter, a business shall include both profit and non-profit business.

(C) CAS number means the unique identification number assigned by the Chemical Abstract's Service to specific chemical substances.

(D) Chemical name means the scientific designation of a substance in accordance with the International Union of Pure and Applied Chemistry or the system developed by the Chemical Abstract's Service.

(E) Common name means any designation or identification such as code name, code number, trade name, or brand name used to identify a substance other than by its chemical name.

(F) Consumer product means a product intended for personal consumption by a final consumer in the workplace, or consumer products packaged for distribution to, and use by, the general public.

(G) Extremely hazardous material means any material, substance, or product which has been found to be fatal to humans in low doses; or, in the absence of data on human toxicity, it has been shown in studies to have an oral LD (Lethal Dose) 50 toxicity (rat) of less than 50 milligrams per kilogram, an inhalation LD 50 toxicity (rat) of less than 2 milligrams per liter, or a dermal LD 50 toxicity (rabbit) of less than 200 milligrams per kilogram or is otherwise capable of causing or significantly contributing to an increase in serious irreversible, or incapacitating reversible, illness.

(H) Hazardous material means any material which is subject to regulation pursuant to Sec. 2.1 of this Chapter. A mixture shall be deemed to be a hazardous material if it contains one percent (1%) by volume or more of any material regulated pursuant to Sec. 2.1.

(I) Handle means to generate, treat, store, or dispose of hazardous material in any fashion(

(J) MSDS means a Material Safety Data Sheet prepared pursuant to Section 6390 of the California Labor Code or pursuant to the regulations of the Occupational Safety and Health Administration of the U.S. Department of Labor.

(K) Permit (Certificate of Operation) means any Hazardous Materials Storage Permit issued pursuant to this Chapter as well as any additional approvals thereto.

(L) Person means an individual, trust, firm, joint stock company, corporation, partnership, association, county, district, and the state, or any department or agency thereof.

(M) Primary containment means the first level of containment, i.e., the inside portion of that container which comes into immediate contact on its inner surface with the hazardous material being contained.

(N) Product tight means impervious to the hazardous material which is contained, or is to be contained, so as to prevent the seepage of the hazardous material from the primary containment. To be product-tight, the container shall be made of a material that is not subject to physical or chemical deterioration by the hazardous material being contained.

(O) Release means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment.

(P) Secondary containment means the level of containment external to and separate from the primary containment.

(Q) SIC code means the identification number assigned by the Standard Industrial Classification code to specific types of businesses.

(R) Storage facility means any one or combination of tanks, sumps, wet floors, waste-treatment facilities, pipes, vaults, or other portable or fixed containers, used, or designed to be used, for the storage of hazardous materials at a facility.

(S) Sump means a pit or well in which liquids collect.

(T) Unauthorized discharge means any release of any hazardous material which does not conform to the provisions of this Chapter.

(U) Use includes the handling, processing, or storage of a hazardous material.

(V) User means any person who uses or handles a hazardous material.

Sec. L-X 2.1 MATERIALS REGULATED

The materials regulated by this Chapter shall consist of the following:

(A) Any material listed as a hazardous and/or extremely hazardous material or hazardous and/or extremely hazardous waste in Sections 66680 and 66685 of Title 22 of the California Administrative Code, as amended, whether such material is stored or handled in waste or nonwaste form; or

(B) Any material which is listed on Cal/OSHA's The Director's List of Hazardous Substances, October 1982, and amended; or

(C) Any material which has been determined to be hazardous based on any appraisal or assessment by or on behalf of the party storing this material.

(D) A material may be added to the list of hazardous or extremely hazardous materials set forth in this Section upon the findings by the Nevada County Health Officer that it satisfies the following criteria:

(1) It does not fall within the purview of exempted categories of materials;

(2) The material, because of its quantity, concentration, or physical or chemical characteristics fits the parameters of the definitions of Sec. 1.2 (G) and (H).

(E) A material added to the list of hazardous or extremely hazardous materials pursuant to subdivision (D) shall be designated as either a hazardous or extremely hazardous material by the Nevada County Health Officer.

Sec. L-X 2.2 EXCLUSIONS

This Chapter does not apply to the following:

(A) Persons who use, store, or handle hazardous materials in the following amounts:

(1) Less than fifty-five (55) gallons of a corrosive or reactive liquid(s) in the aggregate.*

(2) Less than five hundred (500) pounds of oxidizing materials.*

(3) Less than ten (10) pounds of organic peroxides.*

(4) Less than five hundred (500) pounds of nitromethane.*

(5) Less than fifty-five (55) gallons or five hundred (500) pounds of any other hazardous substance as defined by Sec 2.1 of this Chapter.

* NOTE: This conforms to the Uniform Fire Code, latest adopted edition.

(B) A substance designated as a hazardous material by this Chapter solely by its presence on the Nuclear Regulatory Commission list of radioactive materials, shall be exempt from the requirements of this Chapter.

(C) Provisions of this Chapter shall not apply to pesticide use regulated by the California Department of Food and Agriculture pursuant to Division 6 commencing with Sections 11401 and Division 7, Section 12501 of the California Food and Agriculture Code.

(D) Provisions of this Chapter shall not apply to storage and use of any explosives that are regulated by the U.S. Bureau of Alcohol, Tobacco, and Firearms or the U.S. Department of Transportation.

(E) The storage and use of gasoline or other fuels in containers above ground level or in underground containment is specifically exempted from the provisions of this Chapter.

(F) Retail products. Hazardous materials contained solely in consumer products packaged for distribution to, and use by, the general public.

(G) Provisions of this Chapter shall not apply to hazardous waste management as regulated pursuant to Chapter 30, Minimum Standards for Management of Hazardous and Extremely Hazardous Waste, Title 22, California Administrative Code, and Chapter 6.5, Hazardous Waste Control Law, Division 20, California Health and Safety Code.

Sec. L-X 3.1 LABELING

(A) All containers and/or buildings containing hazardous or extremely hazardous materials shall be identified by attachments of the NFPA adopted diamond- shaped red, blue, yellow, and white hazardous material label.

Sec. L-X 4.1 CONTAINMENT STANDARDS

(A) No person, firm, or corporation shall store any hazardous materials regulated by this Chapter until a permit or approval has been issued pursuant to this Chapter. No permit or approval shall be granted pursuant to this Chapter unless permit applicant demonstrates to Nevada County, by the submission of appropriate plans and other information, that the design and construction of the storage facility will result in a suitable manner of storage for the hazardous material or materials to be contained therein.

All installation, construction, emergency repair, modification, closure, or removal shall be to the satisfaction of the Nevada County Health Officer. The officer shall have the discretion to exempt an applicant from any specific requirement, other than the requirement of secondary containment in underground storage facilities if it does not create a potential for or an actual health hazard.

(B) New Storage Facilities. No person, firm, or corporation shall construct or install any new storage facility until a permit or approval has been issued pursuant to this Chapter.

(C) Monitoring Capability. All new storage facilities intended for the storage of hazardous materials which are liquids or solids at standard temperature and pressure (STP) shall be designed and constructed with a monitoring system capable of detecting that the hazardous material stored in the primary containment has entered the secondary containment. Visual inspection of the primary containment is the preferred method. Where secondary containment may be subject to the intrusion of water, a means of monitoring for such water shall be provided. Whenever monitoring devices are provided, they shall be connected to attention-getting visual and/or audible alarms.

(D) Containment Requirements. Primary and secondary levels of containment shall be required for all new storage facilities intended for the storage of hazardous materials which are liquids or solids at STP, unless specifically exempted by Nevada County.

(1) All primary containment shall be product-tight.

(2) All secondary containment shall be constructed of materials of sufficient thickness, density, and composition so as not to be structurally weakened as a result of contact with the discharged hazardous materials and so as to be capable of containing hazardous materials discharged from a primary container for a period of time equal to or longer than the maximum anticipated time sufficient to allow recovery of the discharged hazardous material.

In the case of an installation with one primary container, the secondary containment shall be large enough to contain at least 110% of the volume of the primary container.

In the case of a storage facility with multiple primary containers, the secondary containment shall be large enough to contain 150% of the volume of the largest primary container placed in it, or 10% of the aggregate internal volume of all primary containers in the storage facility, whichever is greater.

If the storage facility is open to rainfall, then the secondary containment must be able to accommodate additionally the volume of a twenty-four (24) hour rainfall as determined by a one hundred (100) year storm history.

(3) Laminated, coated, or clad materials shall be considered single walled and shall not be construed to fulfill the requirements of both primary and secondary containment.

(4) Separation of materials. Materials that, in combination, may cause a fire, explosion, or the production of a flammable, toxic, or poisonous gas, or the deterioration of a primary or secondary container shall be separated in both the primary and secondary containment so as to avoid intermixing.

(5) Drainage system. Drainage of precipitation from within a storage facility containing hazardous materials which are liquids or solids at STP shall be controlled in a manner so as to prevent hazardous materials from being discharged. All drainage systems must have a valve or other appropriate device that enables permittee to control the flow of the drain.

(E) Existing Storage Facilities. Any storage facility in existence as of the effective date of this Chapter, or any storage facility for which a building permit was issued prior to the effective date of this Chapter, which does not meet the standards of Sec. 4.1 shall be permitted pursuant to this Chapter as long as it is providing suitable storage for hazardous materials and so long as it does not create a public health or safety hazard.

(F) Out of Service Storage Facilities.

(1) No storage facility shall be abandoned.

(2) Storage facilities which are temporarily out of service, and are intended to be returned to use, must continue to be monitored and inspected.

(3) Any storage facility which is not being monitored and inspected in accordance with this Chapter must be closed and removed in a manner approved by the Nevada County Health Officer.

(4) An underground storage tank may be closed if the person who holds the permit to operate does all of the following:

(a) Demonstrates to Nevada County that all residual amounts of the hazardous substance or hazardous substances which were stored in the tank prior to its closure have been removed, properly disposed of, and neutralized.

(b) Adequately seals the tank to minimize any threat to the public safety and the possibility of water intrusion into, or runoff from, the tank.

(c) Provides for, and carries out, the maintenance of the tank as Nevada County determines is necessary for the period of time Nevada County requires.

(5) Any person, firm, or corporation having an interest, including a leasehold interest, in real property and having reason to believe that an abandoned storage facility is located upon such property shall make a reasonable effort to locate such storage facility within six (6) months of the effective date of this Chapter.

(6) Whenever an abandoned storage facility is located, a plan for the closing or removing or the upgrading and permitting of such storage facility shall be filed within ninety (90) days of the discovery. A closure plan must meet with the approval of the Nevada County Health Officer.

(G) Maintenance, Repair, or Replacement.

(1) Permittee will carry out maintenance, ordinary upkeep, and normal repairs in a careful and safe manner. No permit or other approval will be required for such maintenance and upkeep.

(2) Any modification which changes the approved plans of a storage facility other than emergency repairs shall be in accordance with plans to be submitted to Nevada County and approved by the Health Officer prior to initiation of such work.

(3) Permittee may make emergency repairs to the storage facility in advance of seeking an additional permit approval whenever an immediate repair is required to prevent or contain an unauthorized discharge or to protect the integrity of the containment. Notification shall be given to the Nevada County Health Officer within twenty-four (24) hours. And within (5) working days after such emergency repairs have been started, permittee shall seek approval by submitting drawings or other information adequate to describe the repairs to the Nevada County Health Officer.

(4) Replacement of any storage facility for hazardous materials, which are liquids or solids at STP, must be in accordance with the new installation standards of Sec 4.1 (D).

(H) Secured Facilities. Access to storage facilities shall be secured by means of fences and/or locks. The access to storage facilities shall be kept securely locked when unattended.

(I) Emergency Equipment. Emergency equipment shall be provided which is reasonable and appropriate for potential emergencies presented by the stored hazardous materials. Such equipment shall be regularly tested and adequately maintained.

(J) Posting of Emergency Procedures. Emergency procedures shall be posted conspicuously in locations where hazardous materials are stored.

Sec. L-X 5.1 HAZARDOUS MATERIALS MANAGEMENT PLAN (HMMP)

(A) Each applicant for a permit pursuant to this Chapter shall file a written plan, for Nevada County's approval, which shall demonstrate the safe storage and handling of hazardous materials. The HMMP may be amended at any time with the consent of Nevada County. Approval of the HMMP shall mean that the HMMP has provided adequate information for the purpose of evaluating the permit approval.

Sec. L-X 5.2 THE HMMP FORM

The HMMP shall include the following:

(A) Facility Description

(1) General Information

The HMMP shall contain the name and address of the facility and business phone number of the applicant, the name and titles and emergency phone numbers of the primary response person and an alternate, hours of operation, and principal business activity.

(2) Facility Map

The HMMP shall contain a Facility Map at a legible scale. The map shall show the location of all buildings and structures, and hazardous material storage facilities, including interior, exterior, and underground facilities. It shall also show access to each facility and location of emergency equipment related to each storage area, parking lots, public and private roads, storm and sewer drains, streams, rivers, lakes or ponds, on or adjacent to the property.

The information in this Section is provided for purposes of ensuring the suitable and secure storage of hazardous materials and for the protection and safety of emergency response personnel of Nevada County. Nevada County shall take reasonable precautions to ensure the confidentiality of the information provided pursuant to this subsection.

The Facility Map shall be updated annually at the time of payment of the permit fee or whenever an additional approval is required for the facility.

(3) Disposal Plan

A disposal plan shall be submitted which outlines the treatment and/or disposal of all hazardous materials. Copies of waste management plans as required for submission to DOHS and/or EPA will suffice to meet this requirement.

Sec. L-X 5.3 HAZARDOUS MATERIALS INVENTORY

(A) Hazardous Materials Inventory Statement. A Hazardous Materials Inventory Statement (HMIS) shall be filed with Nevada County in accordance with this Part. Any person, firm, or corporation which stores any hazardous material in an amount which is equal to or greater than the quantities specified in Sec. 2.2 (A) is required to file an HMIS. Such person, firm, or corporation shall amend the HMIS within thirty (30) days of the storage of any hazardous material not listed thereon but required to be listed by Sec. 5.4, or of an increase above the quantity range listed in accordance with Sec. 5.4 (C).

Sec. L-X 5.4 INFORMATION REQUIRED

(A) Information shall be included in the HMIS for each hazardous material stored in a facility (aggregated over all such material stored in one or more storage facilities) where the aggregate quantity throughout the facility is greater than five hundred (500) pound in weight for solids, greater than fifty-five (55) gallons for liquids, or greater than five hundred (500) cubic feet at standard temperature and pressure (STP) for compressed gasses.

(B) The information in the HMIS shall include the general chemical name, common/ trade name, the manufacturer, United Nations (UN) or North America (NA) number, if available, and the hazard class or classes and the Material Safety Data Sheet (MSDS) or equivalent information as required by Nevada County.

(C) In addition, the HMIS shall state the aggregate quantity range stored at the facility of each hazardous material listed in terms of the quantity ranges stated in Sec. 5.2 (3) above.

(D) The HMIS shall contain sufficient information regarding any releases within the past two (2) calendar years of the hazardous materials disclosed in subsection (A) into the air, water, sewers, or land to educate the community so as to promote understanding of the sources and content of hazardous material releases.

Sec. L-X 5.5 RESPONSIBILITY

(A) Reporting Unauthorized Discharge - Liquids and Solids at STP

A discharge of a hazardous substance from a storage facility is a county health emergency and, for this purpose, the discharged hazardous substance shall be deemed hazardous waste. As soon as any person in charge of a storage facility has knowledge of any confirmed unauthorized discharge of a hazardous material which is liquid or solid at STP, such person shall take all necessary steps to ensure the containment and cleanup of such discharge and shall immediately notify the Nevada County Health Officer, the Nevada County Safety Officer, and all other authorities as required by the California Administrative Code, Title 22; the Porter-Cologne Water Quality Control Act; and the Hazardous Substances Information and Training Act.

Sec. L-X 5.6 CLEANUP RESPONSIBILITY

(A) Any person, firm, or corporation responsible for storing the hazardous material shall institute and complete all actions necessary to remedy the effects of any unauthorized discharge, whether sudden or gradual. The Nevada County Health Officer shall undertake actions to remedy the effects of such unauthorized discharge.

Sec. L-X 6.1 INSPECTIONS AND RECORDS

(A) Nevada County may conduct an annual inspection of each facility, the time and date of which to be coordinated with permittee in advance of the inspection, for the purposes of ascertaining compliance with this Chapter and cause to be corrected any conditions which could constitute any violation of this Chapter or of any other statute, code, rule, or regulation affecting the storage of hazardous materials.

(B) Nevada County may make an inspection whenever there has been a written complaint filed that a possible violation exists.

(C) The permittee shall conduct regular inspections of its own facilities to assure compliance with this Chapter and shall maintain logs or file reports to support such activities. Permittee's representatives conducting such inspections shall be qualified to conduct these inspections.

(D) All underground storage facilities covered by provisions of this Chapter shall be inspected by Nevada County at least once every three years.

Sec. L-X 7.1 APPLICATION FOR PERMIT

(A) Permit. Any person, firm, or corporation which stores any hazardous material shall obtain and keep current a Hazardous Materials Storage Permit issued pursuant to this Chapter. One such permit shall be issued for a single facility. Additional approvals shall be obtained for any storage facility thereafter connected, installed, constructed, repaired as required by Sec. 4.1 (G), substantially modified, replaced, closed, or removed, or for any change or addition in hazardous materials stored not in accordance with prior approval. Storage of new or different hazardous materials, not meeting all of these criteria, shall require the prior additional approval.

(B) Application for Permit. Application for a new, amended, or renewed permit or an additional approval shall be made to the designated officer on the form provided by the Nevada County Health Officer. The application shall include such information as required by the Nevada County Health Officer and which shall at a minimum include: 1) A Hazardous Materials Management Plan as required by Sec. 5.1; 2) Construction plans, if any, in conformity with Sec. 4.1 and certified by a State Registered Engineer qualified to do such work; 3) A statement as to the maximum quantity of each type of material to be permitted for each storage facility; 4) The street address and parcel number of the storage site; 5) A statement by the legal owner of the property that he or she is aware of the subject application and has authorized the use of the property for such purpose.

(C) Investigation. The Health Officer may make such investigation of the applicant and the proposed facility or activity as he or she deems necessary to carry out the purposes of this Chapter.

(D) Approval of Permit. A permit shall not be approved until the Health Officer has determined that the storage approved adequately conforms to the provisions of this Chapter.

(E) Provisional Permit. If the Health Officer finds that the proposal does not completely conform to the provisions of this Chapter, the officer may approve a provisional permit, subject to conditions he or she may impose, when such provisional permit is feasible and does not appear to be detrimental to the public interest. The applicant must be informed in writing of the reasons why a full permit was not issued.

(F) Temporary Permit. A temporary permit for storage may be issued where storage does not exceed thirty (30) days and occurs no more frequently than every six months. The containment standards of Sec. 4.1 (D), the Hazardous Materials Management Plan of Secs. 5.1 and the inspection and records requirements of Sec 6.1 may be modified as appropriate under these circumstances for the storage of hazardous materials.

(G) Issuance of Permits. Upon the approval of a temporary, provisional, or full term permit by the officer, and upon payment of any applicable fee, the officer shall issue and deliver the permit to the applicant. Such permit shall contain the following information:

(1) The name and address of the permittee for purposes of notice and service of process;

(2) The address of the facility for which the permit is issued;

(3) Authorization of the storage facility(s) approved under the permit, the permit maximum quantity limit(s) and the approved hazard class or classes for the storage facility(s);

(4) The date the permit is effective;

(5) The date of expiration;

(6) When applicable, a designation that the permit is provisional or temporary;

(7) Any special conditions of the permit.

(H) Records

(1) The Nevada County Health Officer shall keep a record of all permits issued and all conditions attached thereto.

(2) The Nevada County Health Officer shall coordinate and distribute copies of the Hazardous Materials Management Plan and the Facility Map to:

(a) A specifically designated representative of a county volunteer fire district or the California Division of Forestry.

(b) A specifically designated representative of the Nevada County Sheriff's Department.

(c) To every other public health, safety, or fire official or department having a need to know if that official or department is to carry out its role of protecting the public health, safety or welfare of Nevada County.

(I) Term. A permit shall be issued for a term of one (1) year, excepting provisional permits which may be issued for any period of time up to six (6) months and temporary permits which may be issued for no longer than thirty (30) days.

(J) Renewal. Each permit shall be renewed and a renewal fee paid annually.

(K) Determination. The Nevada County Health Officer shall make a determination with regard to any application for a permit, an additional approval, or a renewal, within ninety (90) days from the date that the application has been completed or compliance with the appropriate provisions of the California Environmental Quality Act (CEQA) has been completed, whichever occurs later. This time limit may be extended by mutual agreement between Nevada County and the applicant.

(L) Fees. Fees shall be set by resolution of the Nevada County Board of Supervisors.

(M) Refund of Fees. No refund or rebate of a permit fee shall be allowed by reason of the fact that the permit is denied or the permittee discontinues the activity or use of a facility prior to the expiration of the term or that the permit is suspended or revoked prior to the expiration of the term.

(N) Transfer of Permit. The permit may be transferred to new owners of the same business only if the new owners accept responsibility for all obligations under this Chapter at the time of transfer of the business and document such transfer on a form provided by the Nevada County Health Officer within ninety (90) days of transfer of ownership of the business. Such transfer of permit shall be subject to approval of the Health Officer.

Sec. L-X 8.1 DENIAL

(A) If the Health Officer has cause to deny the application and determines that it would not be feasible or in the public interest to approve a temporary or provisional permit, then the Health Officer shall deny the application.

(B) Grounds for Denial or Revocation. A permit shall be denied or revoked if the applicant fails to demonstrate adequate conformity to the provisions of this Chapter.

(C) Transmittal of Decision. The decision to deny the application will be given to the applicant in writing, setting forth the findings upon which the decision is based.

(D) Appeal to the Nevada County Board of Supervisors. Within sixty (60) days from the date of deposit of the permit denial decision in the mail, the applicant may appeal in writing to the Board of Supervisors, setting forth with particularity the ground or grounds for the appeal. The appeal shall be accompanied by such fee as is established by the Board of Supervisors by Resolution.

(E) Hearing on Appeal. The Nevada County Board of Supervisors shall set a time and place for the hearing on the appeal and shall notify the applicant, in writing, of such date and time, not later than ten (10) working days from the date the appeal was received by the Board's Secretary. The hearing shall be conducted within thirty (30) days of when the appeal was received by the Board of Supervisors.

(F) Disposition of Appeal. After the hearing of the appeal, the Board of Supervisors may refer the matter back to the originating officer for a new investigation and decision, may affirm the decision of the originating officer, may approve a provisional permit as provided in Sec. 7.1 (E), or may approve the application with or without conditions. The decision of the Nevada County Board of Supervisors shall be the final administrative determination and is subject to judicial review.

Sec. L-X 9.1 PENALTIES

(A) Any person who violates any provision of Sec. 2.1 shall be upon conviction civilly liable to Nevada County for each day in which such violation occurs, depending upon the seriousness of the violation; and if such violations result in an emergency, including a fire, to which Nevada County must respond, that person may be assessed the full cost of the County's response, as well as the cost of cleaning up and disposing of such hazardous materials.

(B) Nevada County may petition the Superior Court pursuant to Government Code 54740 to impose, assess, and recover such sums. The remedy provided in this Section is cumulative and not exclusive, and shall be in addition to any other appropriate penalty provisions of this Code and all other remedies available to the County.

Sec. L-X 10.1 TRADE SECRETS

(A) The Nevada County Health Officer shall protect from disclosure any and all trade secrets coming into his or her possession, as defined in subdivision (D) of Section 6254.7 of the California Government Code and Section 1060 of the Evidence Code, when requested in writing by the user. All files containing information subject to this Section shall be clearly labeled "Confidential."

(B) If a user believes that a request for information made by the disclosure form (HMIS) involves trade secrecy matters, the user shall provide substantiation of the claim of trade secrecy and shall submit the information requested to the Nevada County Health Officer.

(C) Any trade secret information reported to or otherwise obtained by the County Health Officer, or any of his representatives or employees shall not abe disclosed to anyone other than through a court order.

(D) For the purposes of this Section, fire and emergency response personnel and county health personnel operating within the jurisdiction of the County shall be considered employees of the County.

(E) Any officer or employee of Nevada County or former officer or employee, who by virtue of such employment or official position has obtained possession of or has access to information the disclosure of which is prohibited by this Section, and who knowingly discloses the information in any manner to any person not entitled to receive it, shall be guilty of a misdemeanor. Any contractor with the County and any employee of such contractor, who has been furnished information as authorized by this Section, shall be considered to be an employee of the County for purposes of this Section.

(F) Information certified by appropriate officials of the United States, as necessarily kept secret for national defense purposes, shall be accorded the full protections against disclosure as specified by such official or in accordance with the laws of the United States.

Sec. L-X 11.1 MISCELLANEOUS

(A) Disclaimer of Liability. The degree of protection required by this Chapter is considered reasonable for regulatory purposes. The standards set forth herein are minimal standards and this Chapter does not imply that compliance will ensure that there will be no unauthorized discharge of hazardous material. This Chapter shall not create liability on the part of Nevada County, or upon any officer or employee thereof for any damages that result from reliance on this Chapter or any administrative decision lawfully made thereunder. All persons handling, storing, using, processing, and disposing of hazardous materials within Nevada County should be and are advised to determine to their own satisfaction the level of protection in addition to that required by this Chapter necessary or desirable to ensure that there is no unauthorizd discharge of hazardous materials.

(B) Conflict with Other Laws. Notwithstanding any other provision of this Chapter:

Whenever any provision of this Chapter conflicts with the Fire Code as adopted by any fire district or fire department within Nevada County, the stricter shall prevail.

(C) Severability. If any section, subsection, sentence, clause, or phrase of this Chapter is for any reason held to be invalid or unconstitutional by a decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Chapter. The Nevada County Board of Supervisors hereby declares that it would have passed this Chapter and each and every section, subsection, sentence, clause, or phrase not declared invalid or unconstitutional without regard to whether any portion of this Chapter would be subsequently declared invalid or unconstitutional.

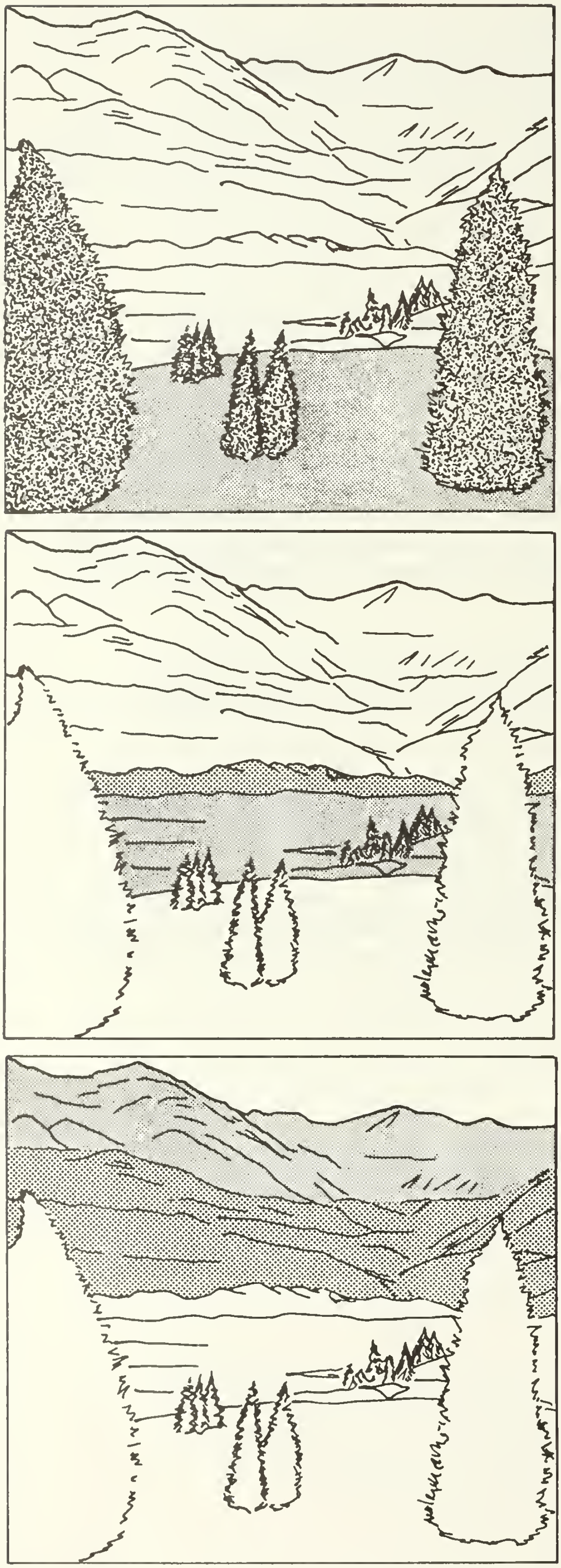

FIGURE 12. Distance Zones

DISTANCE ZONES

Foreground

The limit of this zone is based up distances at which details can be perceive Normally in foreground views, the ind vidual boughs of trees form texture. will ususally be limited to areas within 1 to 1/2 mile of the observer, but must determined on a case by case basis, should any distance zoning.

Middleground

This zone extends from foreground zone 3 to 5 miles from the observer. Textu normally is characterized by the forms trees.

Background

This zone extends from middleground infinity. Texture is formed by groups patterns of trees; individual tree forms a usually not distinguishable.

APPENDIX F

VISUAL MANAGEMENT SYSTEM

COMPONENT I: VISUAL QUALITY OBJECTIVES

Visual Quality Objectives (VQOs) are used as a baseline for evaluating the significance of changes in visual quality and for establishing degrees of acceptable alteration of the natural landscape. VQOs are determined from "Variety Class" and "Sensitivity Level" ratings.

Variety Classes provide a measure of the overall attractiveness or appeal of land based on the premise that all landscapes have some value, but those with the most variety or diversity have the greatest potential for high scenic value. Variety classes are determined by the diversity or dominance of landforms, vegetation features, water bodies, or combinations of these elements.

Sensitivity Levels provide a measure of the overall sensitivity of the viewers to the land. They are based on the premise that esthetic concerns vary among viewers, and those land areas which are visible at relatively short distances, to significant numbers of highly concerned viewers, have the greatest potential for high importance.

Sensitivity levels are established for areas viewed from highways, roads, trails, developed recreation sites, lakes, streams, local communities, and all other areas of significant public or private occupancy from which the land is visible.

Areas mapped as visible are further stratified into three distance zones of foreground, middle ground, and background, as illustrated in Figure 12.

With Variety Class and Sensitivity Levels established, the degree of acceptable alteration of the landscape is determined for all areas, using a matrix which assigns a Visual Quality Objective for each area. The five VQO categories are:

1. Preservation: Allow ecological changes only. Management activities, except for very low impact facilities, are usually prohibited.

2. Retention: Management activities may not be visually evident. Immediate reductions are required in line, form, color, and texture contrasts caused by these activities.

3. Partial Retention: Management activities must remain visually subordinate to the characteristic landscape. Reduction in form, line, color, and texture contrasts must take place within one year.

4. Modification: Management activities may visually dominate the original characteristic landscape. Vegetation and landform alterations must borrow from naturally established forms, line, color, and textural characteristics of the surrounding area. Reduction in form, line, color, and texture contrasts should be accomplished within one year.

5. Maximum Modification: Management activities may dominate the landscape. When viewed as foreground or middle ground, they may not necessarily

appear to completely borrow from natural landscape characteristics. When viewed as background, management activities must appear to borrow from natural characteristics within the surrounding area.

COMPONENT II: VISUAL ABSORPTION CAPABILITY

Visual Absorption Capability (VAC) refers to the ability of land to withstand various types of use without loss of natural character. It is used as a basis for predicting future visual conditions likely to result under different kinds and intensities of management. VAC assessments also provide a measure of the relative difficulty of meeting the recommended VQOs.

COMPONENT III: EXISTING VISUAL CONDITION

Existing Visual Condition (EVC) refers to the levels of natural character that currently exist in the area. The EVC assessment provides a baseline for evaluating the amount of change in visual quality that will result from various management activities. It also provides a measure of how much change in natural character exists today. There are six classes which define existing visual conditions:

Class I	Areas in which only ecological change has taken place. They appear to be untouched by human activities.
Class II	Areas in which landscape changes are not visually evident to the average person unless pointed out.
Class III	Areas in which changes in the landscape are noticed by the average viewer, but they do not attract attention. The natural appearance of the landscape still remains dominant.
Class IV	Areas in which changes in the landscape are easily noticed by the viewer and may attract some attention. They appear to be disturbances, but resemble natural patterns.
Class V	Areas in which changes in the landscape would be obvious to the average viewer. These changes stand out as a dominating impression of the landscape, yet they are shaped so that they might resemble natural patterns when viewed from three to five miles or more.
Class VI	Areas in which changes in the landscape are in glaring contrast to the natural appearance. Almost all viewers would be displeased by the effect.

To summarize, Existing Visual Condition inventories current landscape conditions; Visual Quality Objectives, together with Variety Class and Sensitivity Levels, describe acceptable landscape conditions; and Visual Absorption Capability indicates ease or difficulty of achieving landscape objectives.

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